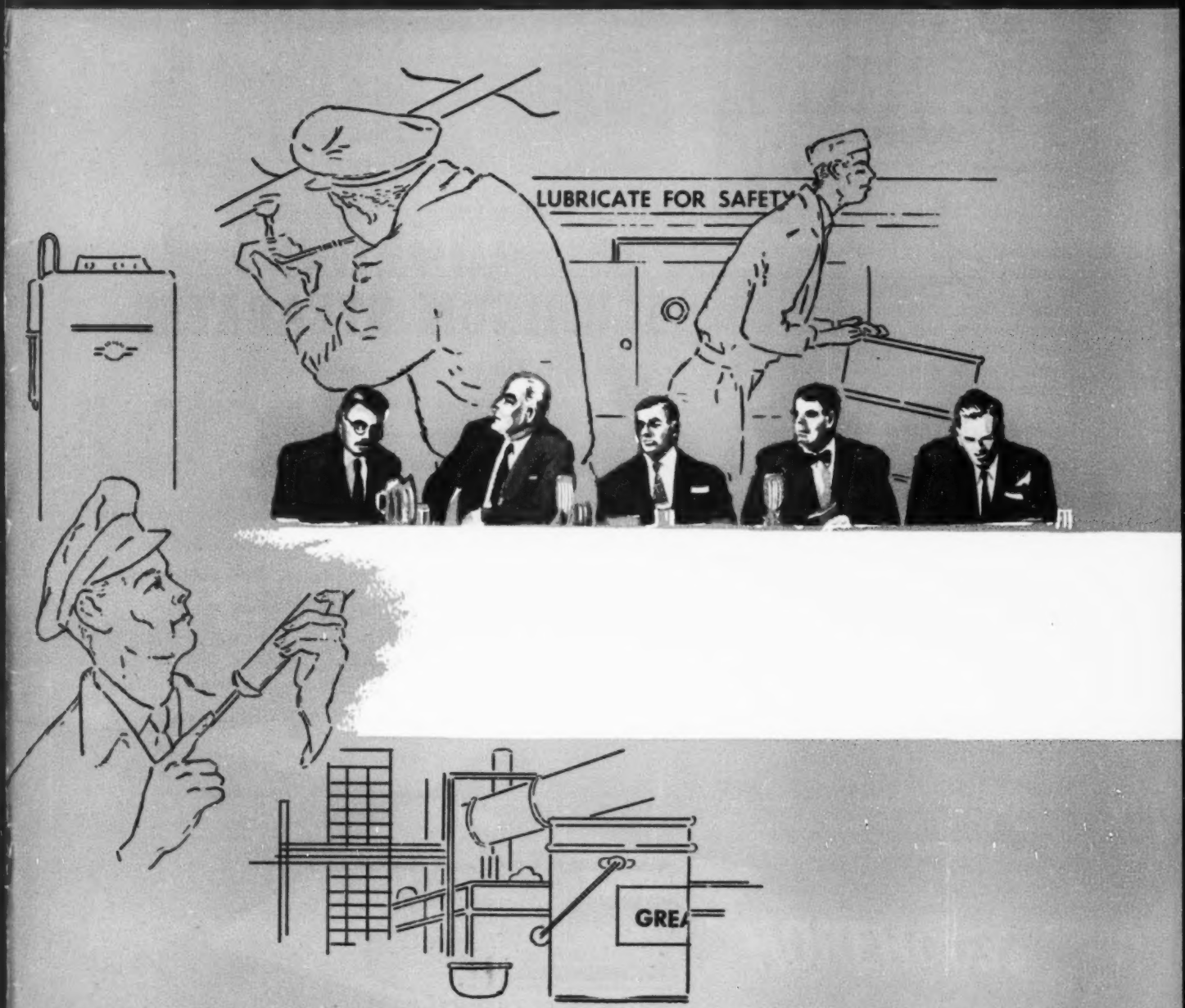
JANUARY • 1964

# NLGI Spokesman

Journal of National Lubricating Grease Institute



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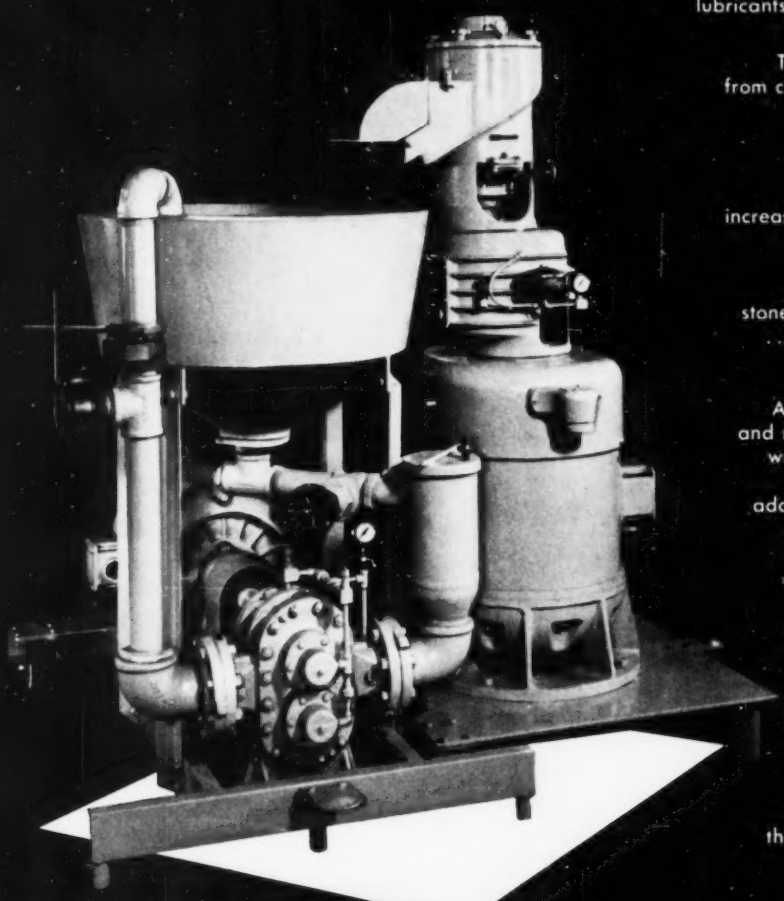

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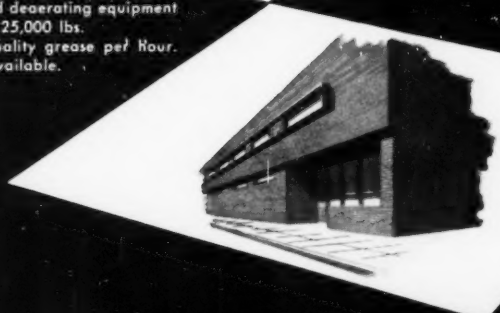

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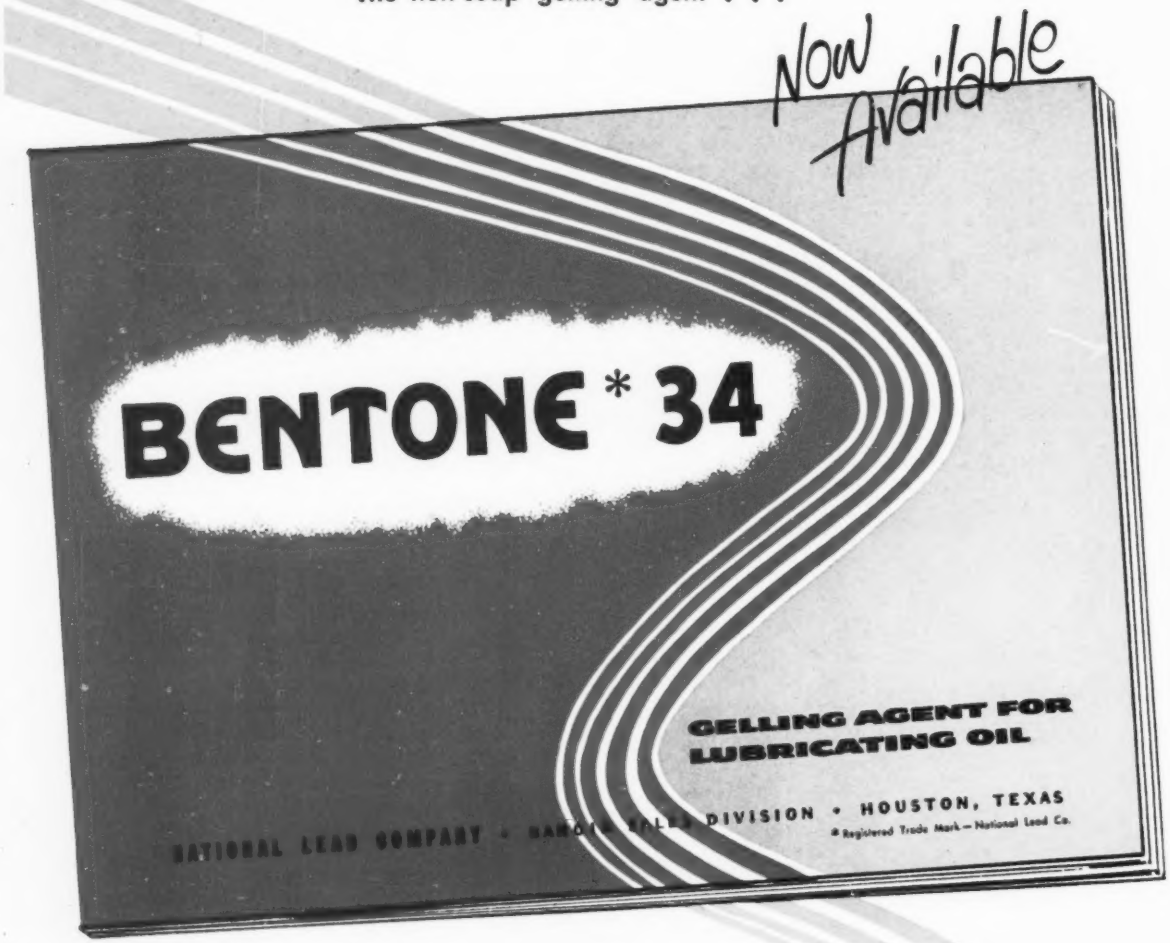
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# President's page

by G. A. OLSEN, President, N L G I

## SECURITY vs. INITIATIVE

One hears much these days about "personal security," particularly as it regards one's future and old age.

It seems to the writer that during the present and the past few years, there has been such an over-emphasis on future security as to build within our minds a paramount regard in this respect, resulting in retarding much personal ambition to attain unusual proficiency or business leadership.

People who place future security on a pinnacle often do not realize that their future liberty may be sold for the sake of what they believe to be personal security, and, as a good example of letting the government take care of you, take a careful look at the present plight of the American Indian.

If we only look through the transom, future security may be all that we may see. However, as we face the New Year and the unfolding future, let's open wide the door below the transom and see the future filled full of opportunities for personal initiative and incentive, which will eventually produce personal satisfaction, together with real security which we will have developed for ourselves, individually, and with it maintain the liberty which our forefathers provided for our benefit.

As individual citizens, we have an obligation to see that liberty is maintained for coming generations and we should not chance destroying it but always keep in mind that when the State giveth, the State likewise taketh away.

Individual initiative and incentive are two of our great assets and should be zealously guarded at all times by all our people, for they are the solid foundation on which our national security is maintained, promising not only the opportunity to provide ourselves future personal security, but, much more important, to maintain our personal Liberty.

"You can't saw wood with a hammer—and
You can't drive nails with a saw!"

Neither can you insure security for old age unless at the same time you also maintain liberty, insuring personal initiative and incentive and the free opportunity to make the most of them for you and yours.

*Published monthly by*
National Lubricating Grease Institute
Harry F. Bennetts, *Editor*
Marjorie Lennert, *Assistant Editor*
4638 J. C. Nichols Parkway
Kansas City 12, Mo.

1 Year Subscription.....$2.50
1 Year Subscription (Foreign)..$3.25

# NLGI Spokesman

Vol. XVII JANUARY, 1954 No. 10

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## ABOUT THE COVER

This copy of your *Spokesman* has an interesting series of five papers delivered during the Annual Meeting Technical Committee Symposium held on October 28, 1953. They represent five distinct points of view on the subject: "DISPENSING LUBRICATING GREASES IN SERVICE STATIONS AND GARAGES."

Catching the spirit of both the occasion and subject our artist, Ronald Jones, pictures here how he thought the panel who discussed the subject appeared and what they were talking about.

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**Start of the Technical Committee Symposium "On Dispensing Lubricating Greases in Service Stations and Garages." Presiding is Symposium Chairman, J. F. Carter. Sitting at table left to right are: John J. Gleeson, A. R. Boyer, J. Reinsma, J. M. Stokely, N. Marusov.**

# Symposium on Dispensing Lubricating Greases In Service Stations and Garages

***Five Viewpoints Offered at the NLGI Technical Committee Session, October 28, 1953***

## Automobile Manufacturers' Viewpoint

**By JOHN J. GLEESON**
**Plymouth Division, Chrysler Corp.**

***John J. Gleeson . . . "Sell and keep them sold."***

We're most appreciative of this opportunity to meet with you gentlemen to discuss some of the problems we all have in common.

As manufacturers, we have only one objective in mind insofar as our products are concerned—sell them and keep them sold. Keeping them sold, you might say is protection of the reputation of our product. This is our way of saying that we hope our owners will continue to enjoy all of the fine performance and long life we try to design into them. Enjoy it to the point where they will some day buy another car of our make knowing that it will serve them well. We're sure that is also the objective of all other manufacturers.

We're very much aware of the important part you gentlemen play in helping us, as manufacturers, give the owner the kind of lubrication service that will make his car dependable and safe to operate—and keep his cost of operation at a minimum. The fact that you are all assembled here today testifies to that.

First of all, let me assure you that we in the service end of the automobile business don't consider ourselves lubrication engineers or experts in the lubrication business.

We rely pretty much on what our own engineers recommend in the way of types of lubricants and frequency of lubrication. So we're going to assume the role of "reporter" and tell you a few things that we have observed that could cause a car owner difficulty. I'll leave it to you gentlemen to discuss the various phases of these problems at the conclusion of our talks.

Take for example overlubrication: everyone in this room knows that there are certain places on a car where overlubricating can be more detrimental than beneficial. It may even bring about premature failure and the car owner unknowingly may feel that the car is at fault. Some typical examples of this are the electrical units such as the generator, starter and distributor. While some of these units are designed to operate with sealed bearings which need no lubrication, they are nevertheless sometimes oiled to the point where they fail to function. Excessive lubricants overflow on to the electrical contact surfaces such as armatures and brushes and introduce resistance by a film of lubricant or cause dirt to form to the point of rendering the unit inoperative.

Wheel bearings are another example. Excessive lubricants in this case may cause the grease to force itself past the seals and enter the braking area of a wheel because of heat generated in braking. We all know the results—erratic brakes or grabbing brakes on one or more wheels. Again the owner may feel that the car is at fault.

Overlubrication or improper lubrication of propeller shafts-U-joints destroy the delicate balance of these units and lead to serious balance and wear problems. This is especially true today with highway travel and high-speed becoming the rule rather than the exception with the family car. It is a responsibility we both share to see that the motoring public—whether it be commercial to earn a livelihood or for pleasure that he enjoys safe, economical travel. The automobile—like most other things in this fast changing world—makes advances by leaps and bounds. Many new methods and techniques discovered of necessity in the last great conflict are being introduced into many of the mechanical conveniences being offered to the American public. The automotive industry is among them.

There are many places on the modern vehicle where rubber—in the form of bushings—is used. These bushings are molded to the parts they support or are clamped tightly between metal washers by the mounting bolts. Such installations will be found in spring shackles—shock absorbers—sway bars—body mountings—and engine and exhaust system mountings. This type of mounting is designed to operate so as to absorb all the twisting and shearing motion within the bushing itself and have no movement between the surfaces of the bushing and its mounting stud or washer. Lubricating the units will destroy the bond and may even cause the rubber to deteriorate. The result is a unit that fails to perform in the manner in which it was designed as well as cause annoying squeaks or rattles. While lubrication may relieve the noise it will not restore the unit to its proper operating efficiency. Not only is lubrication a temporary cure but it also accelerates the rate of wear by gathering dirt and road dust around the moving surfaces—biting into the surface with each movement of the unit. How does the owner feel—"it sure should have lasted longer than that" or perhaps "boy, they didn't make that very strong."

Rear springs with interliners are another point where lubrication is harmful rather than helpful. It again gives dirt and grit a chance to get a hold and cause rapid wear. But more than that—it reduces friction originally built into the springs to the point where the springs do not function properly. "Can't see why it failed—Joe sprayed them regularly." Again the product's reputation suffers a set-back.

Now Joe the local retail salesman of lubrication services is a fine upstanding man. He has a family—his faith in his country—and his God—and a pride in his business and its success. In most cases he is a friend and neighbor of those who use his services. Their children play and go to school together. Never would he knowingly do anything to bring discredit to himself—his business or the products he represents.

As we mentioned before—the modern vehicles are introducing new units—methods and techniques—and—the reason for changes in lubrication procedures is not always evident. The rear springs are a good example. Back a number of years the springs were always sprayed when a car was lubricated. Then spring covers were introduced and we still lubricated—only now through a small hole in the cover with a special tool. With interliner used—the spring covers were discontinued—as they were no longer needed. But to the man who does not understand the principle of operation—lubrication is still vitally necessary at this point.

The number of people who would perform these services knowing they could cause harm are so very few they can be considered non-existent. The basic problem lies in the average lubrication service man not having all the information on the various units and their lubrication needs. Every manufacturer tries to acquaint his buyer with the service and maintenance needs and to pass this information to the various organizations which supply the service or the products needed. Most—if not all—of the organizations you gentlemen represent receive all of the bulletins and technical letters put out so as to keep you posted on the latest changes and recommendations. Unfortunately—the automobile manufacturer can not cover all of the places where cars are serviced—try as he may. A great assist can be rendered through you and your contacts with those using your products to give the lubrication man this needed information.

In closing we'd like to leave this thought with you—our problems are few due to the fine effort of you people. The problems—few that we do have—could be readily solved by promoting a better understanding among dealers who sell your products of the lubrications recommendations made by the manufacturer. The automotive engineers who design our products are vitally interested in satisfactory performance and long life of every unit on the automobile. To this end they are continually testing and observing the need for proper lubrication so they can make their recommendations accordingly. So it is only fair to them that we should strive to adhere to their recommendations and pass them along to the lubrication service man.

Once again—we want to thank you for the opportunity to take part in your discussions.

# A Resume of Today's Complexities In Dispensing Lubricants

**By A. R. BOYER**
**Shell Oil Company**

*A. R. Boyer, Shell Oil Company, brought service station operators' and garage owners' viewpoint directly to audience, clad in service man's coat.*

Gentlemen, mine is the voice from under the car. That's the place you get your hands and uniform dirty while doing the seemingly simple job of transferring lubricant from the factory-filled drum to the automotive part via a fitting. You'll notice that I'm dressed for the job. That's so that you and I both won't lose sight of the locale of my comments.

Mr. Carter suggested that I discuss a series of topics under the general subject of "Dispensing Lubricating Grease from the Viewpoint of the Service Station and Garage Operator." He told me that I'd be talking to some of the best technicians in the Grease Manufacturing Industry. I was already worried before he told me that I'd be talking, as well, to the best engineers in the Lubrication Dispensing Equipment Industry.

Then and there I decided that the only way to talk to this group of experts was from under the car. Under the lift, I rank myself in the "mildly expert" class. I've spent a good part of the last 25 years under the lifts in stations across the country. As a Head Office Representative of the Retail Marketing Department of an oil company, I spend practically all of my time contacting the men in the field who lubricate your cars and mine. This contact generally includes a session under the lift, because it's part of my job to seek better methods of doing the job—better ways of training men to do the job better. I feel at home under the lift—in clothes like these—working with the men who lubricate all makes and models of cars day after day. Working with them, I feel close to them. More than that, I feel I understand them—know how they think and what prompts some of their complaints and suggestions. Let me, as their spokesman for the moment, give you the composite viewpoint of many men under as many lifts in as many stations in practically every state in the country.

Lubricating the modern car is a complex job compared to what it was back in 1910. For example, a common 15-cent oil can, filled with motor oil, was adequate for filling the simple oil holes and oil cups on the cars of that day.

The next stage of development brought the old, familiar grease cup. You'll remember that, when applied, the oil bled from the grease—left a hard soap. To refill it meant digging out the old soap and loading the cup with cup grease ranging from grades 0 to No. 5. To force the grease into the bearing meant, too often, using a pair of pliers to turn the grease cup down. Grease cups with stripped threads were the rule rather than the exception. Remember? As cars became more intricate, lubrication fittings advanced to more complex stages. Pin-type fittings ushered in the modern era of pressure-type lubrication for automobiles. Hand operated, screw-type guns forced grease into the fittings. Some car manufacturers proudly advertise the fact that the vehicle was delivered complete with a lubrication gun.

It was only a short step from the hand-operated to the power-operated grease gun. It made the job a lot easier by removing some of the muscle power. But, as most of you know, it also brought complications.

Problems with pin type fittings led to the development of push type fittings. By that time, lubrication guns of the power-type had come a long way and it was relatively easy to apply an adapter to the fitting that would force the grease into the bearing. But, there were complications here, too. Sometimes the small orifice became clogged with dirt, grime and grit which eventually was forced into the bearing by a subsequent application of grease.

Today, as you know, fittings are of the hyraulic type. They have a ball head with a ball check on the inside. The grease gun adapter for this fitting has jaws which tighten with the pressure as it's applied, grip tight and permit pressures well over 10,000 pounds per square inch. Obviously, today's fittings are far superior to those which appeared a little lower on the evolutionary tree. The development has been steady, and further improvements surely are over the horizon.

At the other end of the "drum to fitting" chain—there's the lubricant. All of you remember when many different kinds of greases and lubricants were needed to service an automobile. I recall a survey in the early '30's which stated that some 100 or more types and grades of lubricants and greases would be needed by the average dealer to correctly lubricate all cars. No dealer could either afford or allocate the space to a stock that extensive. Here, then, was a multiplicity of products that invited the use of the wrong product in many cases. The oil industry, particularly the grease manufacturing segment,

solved the complexity by the development of a single multipurpose grease. Some of the men in this room, tonight, had a hand in developing the products that have simplified the general lubrication problem. There's no doubt in my mind that continued development of lubricants will serve to iron out the complexities of the future.

Now, how about the rest of the "drum to fitting" chain? In that simple job of transferring lubricant from the factory-filled drum to the fitting, there are two more important links. I've sketched briefly the development of fittings, and the development of lubricants. Between the two—there's a man (like myself) and there's a wide variety of dispensing equipment. Remember this, though, without the man under the lift—nothing happens. He's the central figure, the intelligent force whose labor directs the flow of lubricant via dispensing equipment to the proper fitting. What about the development of lubrication men who can perform the complex painstaking task of modern day lubrication?

Let's look at the men. They're of all ages—from very young men on up to considerably older men. Because I've worked with so many of them, I'm convinced that a desk-side view of them as being all alike is far off the mark. Each one is a distinct personality—yet all of them have many traits, aptitudes and attitudes in common. For example, while few of them are college graduates or even high school graduates, many of them find practical answers to lubrication problems that stump some of our best engineers. On the other hand, too many of them don't want to bother with careful work. Some are downright lazy, others are reliable workers of the highest order. All of them have a sense of pride—either in the amount of work they can accomplish—or in the amount of work they can get by with.

Our problem has been and will continue to be a never ending hunt for better ways to train and motivate all of these men. Visual aids of all kinds, appealing to the sense of sight, touch and hearing are widely used. We have learned to make training materials as simple as possible. We've learned that we can't expect busy service men to read, digest and apply complicated service instructions and procedures. We've learned to appeal to their self interest, to ally it with the important job of automotive lubrication service.

To cure the complexities of dealing with and guiding the efforts of a large group of men, some experts would have you believe that all this country needs is, as they put it, a good depression. We don't believe that there's any such thing as a good depression. Better training techniques, better methods of doing things is the American way to a solution for shoddy workmanship. Economic intimidation, the depression club, is no substitute for intelligent incentive.

We believe in the man under the lift. We believe that we can earn his cooperation by communicating instructions that are simple and easily understood. The two factors, simplicity and understandability, are far more important under the lift than the technical aspects that may be involved.

The company I represent has a broad program emphasizing the importance of automotive lubrication. Our men under the lifts know that our entire service station retail merchandising program centers on lubrication. We are convinced that, if our service stations deliver competent lubrication service, our customers will automatically rely on us for gasoline, motor oil, T.B.A. and everything else our stations offer for sale. Our dealers know that we believe that the motoring public is entitled to a visual safety check each time a car is serviced. They recognize that such an inspection, while a car is on the lift, is the surest means to more sales of automotive necessities. They are aware, most of them, that the motorist says literally: "You're the expert, take care of my car."

Over and over and over again, our dealers hear and see the emphasis on lubrication as the basic confidence builder. We point out the dangers of a slip-shod work in terms of self interest. We ask them, literally, whether the confidence they've earned from their customers would survive a broken fan belt, a dead battery or a freeze-up on the day after a lubrication job. Most of them realize that once confidence is gone the motorist will take his lubrication business elsewhere, and without question the gasoline, motor oil and T.B.A. business will go with it.

All of this is related to the dealer's self interest—his profit—resulting from good, thorough lubrication work. In this area there's a problem too. Today, the average service station dealer cannot continue in business, paying his operating expenses, amortizing the cost of equipment and tools, paying salaries at today's levels and still price lubrication work at an average of $1.50 per car.

Here, the solution has been to emphasize again the basic need for thorough lubrication and service for the whole car. With a $1.50 price for simple chassis lubrication *only*, the dealer's profit status can be preserved by extra revenue from other required and specialized services which every car needs at specified intervals. These extra services actually help build customer confidence.

So much for emphasis on lubrication. Our dealers and our men under the lifts gather that it's important to them and important to the customer.

How about the actual mechanics of doing the job? Here, too, progress has moved along to parallel the development of fittings and of lubricants. The training and educational materials that reach dealers today are much improved over those of a few years ago. Gone is the day when you could put a grease gun in the hands of a new man, give him some vague information, then expect him to turn out the kind of lubrication that motorists require.

Today, the company I work for has more than 50 training centers throughout the country. We hope to expand the number in the near future. In some sections, training schools are mobile, moving from place to place on a continuous schedule. Their sole job is that of training dealers, the men who work for them and any jobber personnel who market our products. To earn the customer's confidence and to make the resultant services profitable for the dealer—we've found no substitute for thorough but simple training.

To do that job, we have to start with an understandable lubrication program built around definite basic materials. With us, this includes complete lubrication information, complete T.B.A. information, correct "how-to-do-it" instructions, adequate equipment and tools plus a simple and workable customer reminder and follow-up system.

For best work, we've found that lubrication information must be pictorialized by a diagram. It must be easy-

to-read, easy-to-understand. Today's car, with its new innovations such as automatic transmissions, power steering, hydraulic mechanisms, air conditioning and the like, makes it imperative that the men under the lifts have complete and accurate information available at all times.

To print the material, to furnish an attractive wall box to hold it isn't enough. We've got to consider the men under the lifts—the charts must be visible to them at all times, the instructions on each lubrication diagram obviously linked with the customer job ticket or invoice. This makes the job simpler, makes it easier for the service man to do the work thoroughly, record it and report needed items to the customer.

Remember, that to men under the lifts, lubricating the average car is complex, It's so complex, at times, that it sometimes leads to the other extreme of over-simplification. How many times have you heard a service man say, "I've been greasing cars for 20 years—I know them by heart." He acts like he knows them by heart, but down deep he's not so sure. Service recommendations are on a mileage basis; assemblies and component parts of cars vary from model to model. No service man can remember all of the detailed information on all the makes and models of automobiles that turn up on the lift over his head. By bringing the lubrication information and instruction data in line with the job tickets, service men are prompted to seek out the extra services or replacements that are part of an intelligent lubrication job. The average motorist expects that kind of service, since in most cases, he himself doesn't know when his wheel bearings should be repacked, the air cleaner serviced or the filter changed. For the dealer, the results of the program are evident in the cash register.

There's still much to be done. We are currently developing a portable service unit for use in our lubrication rooms. We hope that it will improve the merchandising of automotive lubrication and consequently increase the dealer's income per job. Attractively designed, this new portable unit will attract customers attention. Separate compartments will contain lubrication diagram charts, T.B.A. cross-reference cards for all models, service instructions complete with "how-to-do-it" illustrations as well as customer job tickets, credit invoices and writing materials, etc. Being portable, the unit will literally be able "to work with" the men under the lifts. Not only will all the data be close at hand, but the unit will have compartments for such incidental equipment as oilers, hand guns, seat and fender covers and the like.

From this brief review, you can understand that training is a never-ending job. Neither is it a static job. New developments and new techniques are constantly being used to make the complicated and painstaking job of automotive lubrication easier and faster for the man under the lift. The more we simplify, the more we "speak the language of the man under the lift," the greater are the dealers' and motorists' rewards in lubrication jobs done better.

I've tried to outline some of the training techniques used to make the men under the lifts better workmen, better dealers, better money makers. The lubrication equipment those men use can be designed to do much the same. For example, we've reversed our policy on lubrication dispensing equipment. For years, we've recommended the wall-battery type of lubrication equipment for service stations and garages. Lubricant, in this type of installation is piped from the wall battery to overhead reels. Today, since the pioneer days of lubrication are over, we are certain that motorists are convinced that oil company service stations are adequately equipped to turn out competent lubrication jobs.

As a result, we now recommend that lubricants, in their original drums along with pumping units, be placed in the storage room out of sight. The lubricant is still piped to overhead reels but with a considerable saving in space for the lubrication room. That space, used for display, is highly valuable in promoting sales . . . a distinct dollar and cents benefit for the dealer. In addition, this arrangement saves money on equipment. Admittedly, a good-looking wall battery has eye-appeal for the motorist, but the two money producing advantages outweigh the value of the eye-appeal. For large dealers and garages, we recommend a similar storage room installation for lubricating oils, as well. It speeds up service—an important item to profitable operation in these days of high labor costs.

Beyond the selection of such types of available equipment which I've described, oil marketing companies can go no further in helping to simplify lubrication for the men under the lifts. The lubrication equipment actually handled by the man under the lift is remarkably alike, regardless of who makes it. Here, for example, is an array of adapters which all equipment makers recommend. As most of you know, all equipment companies for the most part, make and sell adapters that are pretty much alike. All of them agree, too, that all these adapters are necessary because auto makers insist on locating fittings in remote, hard-to-get-at places—that proper lubrication of such points depends on adapters like these.

That's so, but the men under the lifts don't agree that a wide assortment of adapters is the practical answer. Neither I nor the other men under the lifts are equipment experts. We try to be lubrication experts. We need help from the equipment makers because it takes valuable time to attach an adapter, much less to find the correct one for the specific fitting.

The idea of a separate adapter interrupts the flow of work. It's a stone in the road that throws the whole job out of kilter. Too often, it's the single obstacle that leads to skipped fittings and a general decline in the quality of lubrication jobs. Development of a better method—some way to lower the barrier of highly special adapters for remote fittings—is not the sole responsibility of equipment makers, believe me. The oil marketers, the service station dealer, the car manufacturer and you men in the fields of lubricant manufacture and equipment manufacture will agree that all of us must find ways to speed up the lubrication of the cars that drive into the average station. But, accuracy must not be sacrified to speed. Both volume and quality are necessary to the dealer's survival.

Believe me, the case of the missed fitting (or more usually, fittings) is not unusual in service station lubrication. Neither is it unusual in dealer garages or even car maker garages. For instance, one of the major automobile manufacturers maintains a large export office in New York City. Many of the company's directors visit this office. For them, the company maintains a fleet of cars

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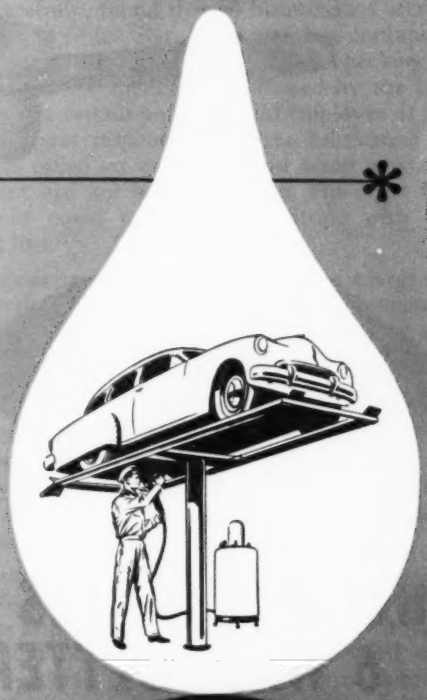

Some greases protect against corrosion by absorbing water, but often soften, invert and disintegrate so that water eventually gets through to bearings and other vital parts.

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which include all of the different automobiles that they manufacture. This fleet is for official business use. One particular model in this fleet was giving considerable trouble, the chief complaint being that it had squeaks.

The factory mechanics who serviced these cars checked the records carefully, found that all maintenance service technically was in order. But, the complaints continued, the cars still squeaked. Finally, after more checking, it was disclosed that the squeaks were caused by the lack of lubrication at a certain point. An old employee of the company, who was responsible for the lubrication of these cars, was called on the carpet and asked why this particular point had not been lubricated. His reply was very simple—he could not reach the fitting with the equipment he had.

Now if this can happen to the top experts of a large automobile manufacturer, it can also sometimes happen to the cars of the motoring public. I am positive that this particular manufacturer will continue to build better automobiles with the thought in mind that these cars will require a minimum of service. We all know that progress is fast, once it gets started, and this particular manufacturer deserves the utmost confidence. They are an aggressive company and I am positive that they will lick this part of their over-all problem. Nevertheless, the problem was found to exist.

If you gentlemen who are in the lubrication equipment business, could find some way of eliminating as many of these adapters as possible, you may take my word for it that you would be taking a long step toward simplifying the general problem of automotive lubrication. As I said before, I do not profess to have the solution, but I believe that it can be solved by the ingenuity of the engineers which your different companies employ. There is no question but that lubrication dispensing equipment today is good looking, has eye appeal, and is of the finest quality. But for the man under the lift there are parts of this equipment that should be rearranged and improved to simplify the lubrication of cars.

Here is another example. There are two types of hydraulic couplers, one large and one small, both designed to do the same job and with the same pressures. The smaller one is preferred because it can get into more places. The large one, unable to reach the fittings of some universal joints, because clearances will not permit is "wasted" on most men under the lift. Take a 360° swivel, with hydraulic coupler, say the men under the lift, can it be made part of the high pressure control handle, using light weight metals. A high pressure control handle for them should also have a positive control, over high and low pressures. We realize that all control handles will vary pressure-lubricant volume according to hand grip. Is it necessary that the man using the equipment control the pressures with his grip? Positive control would be simpler and more desirable.

As to the length of the adapter on this control handle, if there were some way to make this adjustable, ranging say from four to eighteen inches, this would be a wonderful accomplishment. Again, I am not in a position to tell you how to do this, but I certainly do have a deep feeling that it can be done.

Such a high pressure control handle, incorporating such features, would reduce the need for many adapters. This, in turn, would not only speed up the job of lubrication, but reduce the hazards of slipshod work. The motoring public would stand a better chance of getting the correct lubrication work they expect and pay for. This would indeed be a real service to the men who must use your lubricating equipment under the lifts.

My subject today is one that has many ramifications, but I do not want to be inconsiderate of the time which has been allotted to me. I have tried to tell you generally, and as briefly as possible, about some of the problems which are in the minds of the people upon whom we rely to provide automotive lubrication. We all know that the lubrication of passenger cars is a part of one of the fastest expanding markets that exists in the selling and service field today. This market has increased every year, from the day that the first automobile appeared on the highway, and there is nothing to indicate at this time that it will do anything but increase from here on out.

Such a sales and service potential represents a challenge to you people who are associated with manufacturing of lubricants and lubrication equipment. Time and simplicity are the essential factors and if in your future plans you can give these two factors a top-notch spot in your planning, then our little discussion today will have accomplished something.


## SYMPOSIUM REPRINTS—

**The five symposium papers delivered during the Annual Technical Committee Session are completely reproduced in this issue. In addition, stenographic notes of floor questions and comments were taken and will appear in your March copy.**

**REPRINTS—will be available of both these papers and comments after appearance of your March issue. You will be notified when and price at that time.**

# Lubricating Greases from the Viewpoint of the Dispensing Equipment Manufacturers

**By J. R. REINSMA**
**Stewart-Warner Corporation**

***Here is the dispensing equipment manufacturers' standpoint on the subject being presented by J. Reinsma, Stewart-Warner Corporation.***

**I. INTRODUCTION:**

A. Gentlemen, my subject matter is "Dispensing Lubricating Greases from the viewpoint of the Dispensing Equipment Manufacturers."

From the viewpoint of the Grease Dispenser Manufacturer, our part in a job of lubrication is to design and market equipment capable of delivering lubricant to a bearing surface. With this in mind, you can readily appreciate our concern over bearing design for we must make available enough force to inject grease through any restriction offered by a bearing. By the same token, grease flow characteristics are important to us because grease is the material our equipment works upon from the time the grease leaves the drum. Thus you have the prime influences upon the design of our product:

1. Bearing design . . .
2. . . . and the grease used to lubricate these bearings

To further implant our viewpoint upon you, permit me to reminisce for a moment and display the part these factors played in the introduction and development of pressure grease dispensers. The first dispenser was a screw-type, hand gun that developed 500 PSI. It was put on the market in the Spring of 1918, and by that summer this hand gun was recognized as the best available grease dispenser for servicing automobiles.

**CHART I—Man Lubricating Car with Screw-Type Hand Gun**

The screw action of this gun was slow, but it was positive enough to move the slow flowing cup greases of those days.

The year 1920 saw the introduction of automobiles capable of 50 MPH and better. These improved cars incorporated higher speed bearings and closer fitted suspensions.

By 1921 chassis type greases had replaced the old cup grease, and they were being produced in quantities necessary to service the fast multiplying number of cars on the roads. Traveling salesmen had their model "T" Ford. The enthusiast had his "Stutz Bearcat," and we had the problem of moving these new chassis greases into bearings that required 2,000 PSI to penetrate them. We had developed this higher pressure and at the same time moved a greater volume of grease by bringing out hand and foot operated power guns.

**CHART II—Foot Operated Gun**

These foot operated dispensers made available greater pressures, moved larger volumes of grease and at the same

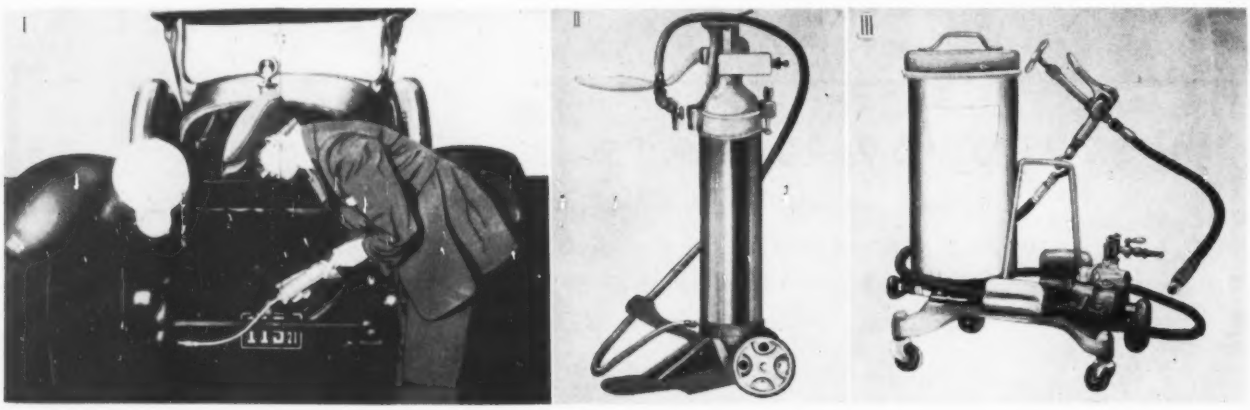



**Chart I** **Chart II** **Chart III**

**The manufacture of dispensing equipment has progressed right along with the improvements in automobiles. Chart I shows the screw type hand gun that came out in 1918. By 1921 the foot operated gun of Chart II was in use. The first air operated dispenser, shown in Chart III, was needed by 1925.**

time, because it was pumped by foot, freed one hand of the operator for other work.

**CHART III—First Air Operated Dispenser**

By 1925 Car Factory assembly lines were producing cars in such numbers that service stations were required to specialize in greasing automobiles. With this increased number of automobiles, the demand was for greater efficiency and ease of operation in dispensing greases.

The story continues in the same pattern to the present time—faster automobiles in greater number dictated "power for pressure"—"pressure for speed" in handling greater volume of specialized greases. "Power" and "Pressure" became the "whip" that demanded more efficient grease dispensers.

I hope this reaching back has done more than merely remind you of those years through which many of you have lived. I hope I have established the bond that exists between the development of automobile bearings, their lubricating greases and the development of grease pumps.

## II. TODAY'S SERVICE STATION EQUIPMENT

Today's service station equipment is an outgrowth of this development. Modern super service stations' dispensing equipment is primarily a stationary system. This system incorporates a barrel type pump that delivers chassis grease in volume from its original container.

**CHART IV—Barrel Pump in Drum**

Follow me on these charts, and I will discuss the purpose and advantages of the components of this system.

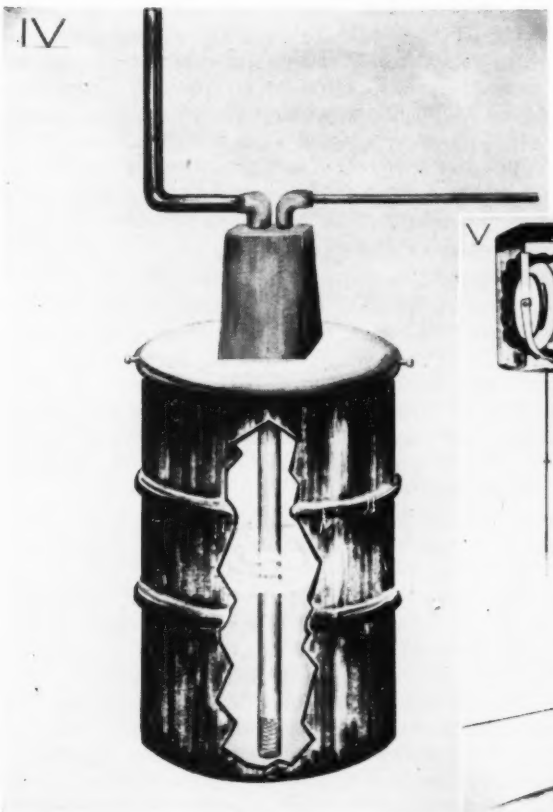
A. *Pump*:

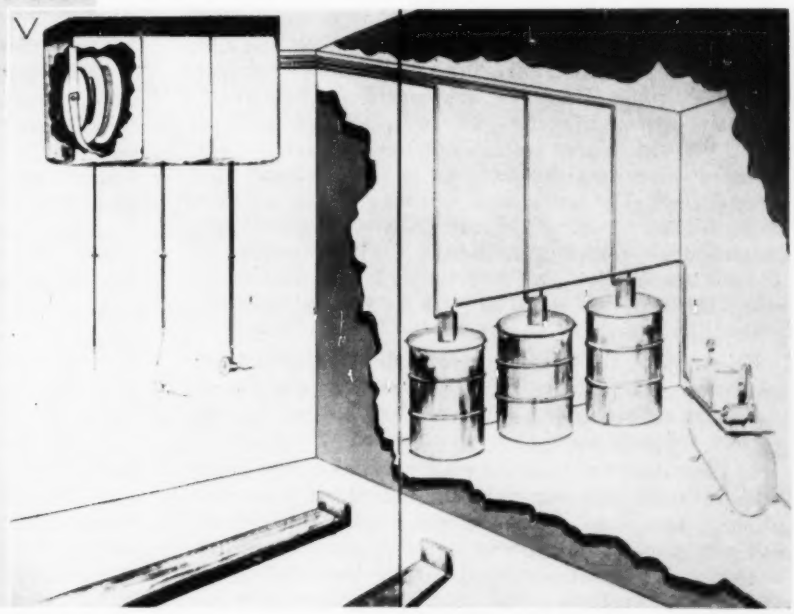
The dispenser is a compact, air operated pump that develops grease pressures that are 40 to 50 times greater than the input air pressures. Since these pumps deliver from the original grease container, the need for handling grease to fill the pump reservoir has been eliminated. With today's air pressures ranging from 150 PSI to 185 PSI, we have 7,000 to 8,000 PSI grease pressure available. This pressure is adequate to penetrate modern automobile bearings and, in most cases, deliver a sufficient volume of grease. This pump may be remotely located from the activity and close quarters of the lubrication area and provides a saving in valuable working space since it puts the dispenser in the grease storage area. It may also be located within the lubrication area as shielded equipment. For small volume operations a barrel pump in a grease drum may be mounted on a dolly for portability in place of the above system.

**CHART V—Complete Stationary System**

B. *Pipe and Hose*:

Stationary systems have one disadvantage in that their remotely located pump has to move the grease from the original container through pipe, hose and control valve to the point of lubrication. As in the case of moving any mass, this is work—work that the stationary pump must do. Despite this work penalty, the pipe and hose has two great advantages which dictated its inception. The entire installation of pipe and hose is *off the floor* and *immediately available for use*. The hose reel assembly pictured on this chart has many advantages such as:




**Today's dispensing equipment is quite a contrast to that of yesteryear. Chart IV shows the handy barrel pump in drum that can be mobile or stationary. Chart V pictures the complete stationary system that keeps the hose off the floor, makes the control valve readily available, and is neat in appearance.**

Chart IV

Chart V

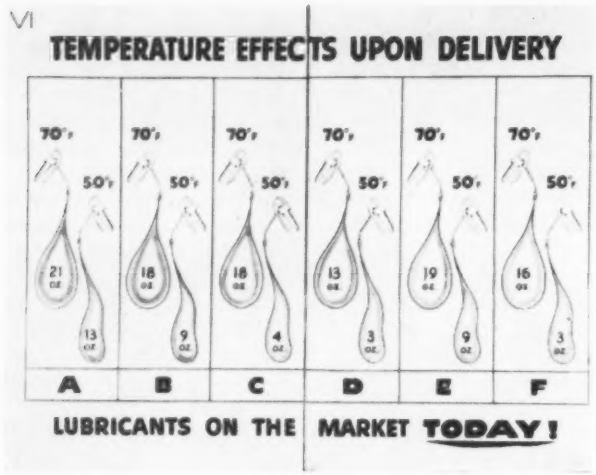



Chart VI

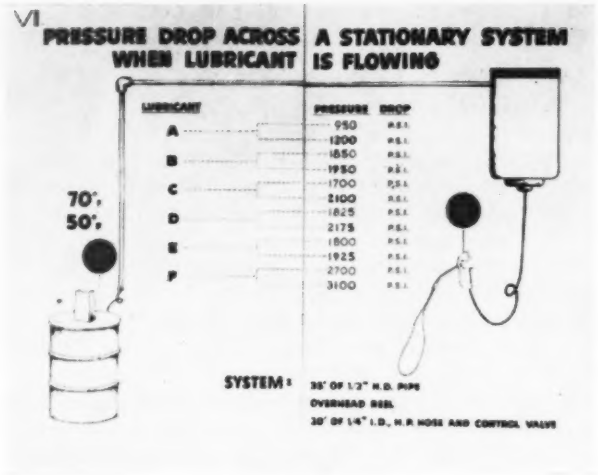



Chart VII

1. It removes the hose from the floor where it is subjected to abuse.
2. It provides a semi-automatic container for the hose that is simple in construction and has a positive mechanical action.
3. It makes the control valve readily available which results in a faster and labor saving lubrication job.
4. Its neat appearance contributes to good housekeeping, and it utilizes only the *air rights* in a room.

### III. ADAPTERS AND ACCESSORIES:

The modern barrel pump lends itself and its efficiency to many variations of the stationary or portable application. These pumps and systems have actually been developed beyond the 6,000 PSI pressure requirements for today's automobile bearings. On many applications pressure relief accessories are recommended. These accessories take the form of adaptors that fit onto the control valve and automatically vent excessive pressures.

Pressure relief accessories are primarily used to protect sealed bearings requiring low pressures such as universal joints and rear wheel bearings. Special adaptors are also provided to reach restricted and otherwise "hard to get at" grease fittings. There is an adaptor that fits onto a control valve that permits the operator to select a "*high*" or "*low*" pressure. There are also adaptors that are actually extension pipes specially designed to reach remotely located fittings. The business of providing proper adaptors to permit the servicing of every point of lubrication on an automobile is kept up-to-date by a constant survey of all new automobiles. This survey data is then used to develop the proper adaptors to be used with the basic grease dispensers.

To augment the versatility and efficiency of a basic installation, many accessories have been made available. As an example, to more efficiently handle slow flowing greases, follower plates have been applied.

In these cases the follower plate is sealed to the lower tube of the barrel pump and fitted against the inner wall of the grease drum. Once this seal is established by the follower plate, the pump can take full advantage of the atmospheric pressure for priming. This has an allied advantage of effectively cleaning all the grease from the original container. These follower plates are another example of development by our two prime factors: Bearing design—the grease to lubricate them.

Slow-moving, multi-purpose greases that are in vogue today necessitate the use of this accessory for merely handling the grease within the drum. This accessory is needed on both stationary and portable units when using slow flowing greases.

Thus you have a basic chassis lubricator and some of the adaptors and accessories that are used with them.

### IV. SPECIALIZED GUNS:

In addition to the chassis lubricator, we also have specialized hand operated guns. These guns are referred to as specialized guns because they usually handle a particular job of greasing such as on a water pump, wheel bearings, universal joints and, recently, specialized guns have been used to fill power steering assemblies. There was a time when these specialized guns were used for special lubricants, but in recent years they have been put into service to do a faster, more complete job of servicing specialized mechanisms.

#### PROP I—Empty Coke Bottle

Gentlemen, have you ever thought of this "coke" bottle as a specialized lubricant dispenser? This bottle "that fits the hand" had made many an attempt at filling steering gear bases and has accomplished the job only after much wasted time and material. Present day specialized guns will not only fill a conventional or power steering gear case, but they will do it faster and without spilling a drop of lubricant not to mention sealing the lubricant from dirt contamination.

Automatic transmissions require a volume of very clean fluid for proper servicing. To meet this requirement, both power and hand operated automatic transmission fluid dispensers have been put on the market. The proper use of these dispensers and lubricant dispensers in general has been explained to men in the field by our industry's extensive training program. This automatic fluid can be dispensed in bulk to reduce handling and contamination. Stationary systems of the type I have described for handling chassis grease can be expanded to dispense transmission fluid, gear lubricant and motor oil as well as chassis grease from original containers through sealed systems directly to the point of application.

Today we have a dispenser that will deliver every type of automotive lubricant in the same un-contaminated condition in which it enters the drum or barrel.

**V. COOPERATION BETWEEN INDUSTRIES:**

In viewing my little "flash-back" in our history, you are undoubtedly aware of the influence the automobile had on our development. This influence has established a bond between the Car Factory and Dispenser Manufacturers that has nurtured a high degree of cooperation. When you reflect a moment and recall that Ford's last Model "T" built in 1927 was equipped with oil and grease cups and compare it to the automobile industry's present day standardization on hydraulic type grease fittings, we have indeed come a long way and enjoyed much cooperation.

You recall that I noted cup grease was used with the first 500 PSI screw-type, pressure gun. At that time it was the only grease available. Grease manufacturers came to our aid in the early 1920's and developed a freer flowing type grease that was better suited to pressure lubrication. Through the years grease has actually been the prime influence in our development. We know of a new bearing, because of the new grease, that has been developed for servicing that bearing.

Grease is what we handle. Grease is what we live with. This relationship is continued through the years and can be noted in the proposed standardization of lubricating grease containers. This standardization, soon to be a reality—has been long sought after. Although such standardization will result in temporary difficulty, such as the changing of equipment in the field, we feel that it is a great step forward.

The temporary difficulty would be encountered in adapting pumps that are already in the field to the new size grease container. Already our industry has prepared the first steps in making this change-over in the field. It is certainly to the credit of such organization as the *National Lubricating Grease Institute* who have sponsored this high degree of cooperation between our industries. However, we have a problem that has arisen in comparatively recent years. I alluded to this problem in mentioning the stationary system. The advantages of this system with its long pipe and hose lines has made them very popular in the last fifteen years. As I mentioned, this pipe and hose penalizes the grease pump by requiring it to move the grease a greater distance, or to do a greater amount of work. The problem was amply met for years by using higher pressure and greater horsepower pumps in stationary systems. Difficulty arose when the trend in grease went from fast flowing chassis grease to slow-flowing, multi-purpose grease.

The dispenser manufacturers' problem is this:—Most modern greases are harder to move through pipe and hose lines than their predecessors. This results in excessive pressure line drop over a system. We manufacturers can design pumps that will develop any pressure that may be required, but the limiting factors dictated by accessories, placed a ceiling on the practical working pressure.

As soon as the lubricant begins to flow, pressure in the system is reduced at the control valve while the pressure at the pump end of the system is still up to the stall point of the pump. This is due to the slow flowing characteristics of today's multi-purpose greases. This condition is greatly aggravated by seasonal changes in temperature—temperature changes that are not radical but merely the range of temperatures that would be experienced in a 24 hour period.

Experience indicates the 50°F. is the critical temperature for today's greases. Below 50°F. these greases flow much slower and require increased pressure to move them.

**CHART VI—Temperature Effects on Delivery**

To better display this point, let me direct your attention to this chart. This chart gives the comparative deliveries through a common pumping system for several popular greases on the market at 70°F. and at 50°F. I want to call your attention to the differences in delivery that are affected by this single variable—temperature.

CHART DATA

| Grease | 70°F. | 50°F. |
|---|---|---|
| A | 21 Oz. | 13 Oz. |
| B | 18 Oz. | 9 Oz. |
| C | 18 Oz. | 4 Oz. |
| D | 13 Oz. | 3 Oz. |
| E | 19 Oz. | 9 Oz. |
| F | 16 Oz. | 3 Oz. |

I make this point to emphasize the problem that is great enough at favorable temperatures but is greatly aggravated by a mere 20° fall in temperature that may be experienced over the major part of our country.

**CHART VII—Pressure Drop Across a Stationary System**

Let me go on to discuss our specific concern in this matter, the pressure drop across a stationary system carrying these greases. If we take the average pipe length in a stationary system as 30 to 35 ft. and the popular pipe size as ½" heavy duty, add to this 20 ft. of standard ¼" I.D. hose, we will have the average service station installation.

Granted this, let me show you on this chart comparable flow characteristics of these same popular greases over this average installation.

CHART DATA

| Grease | 70°F. | 50°F. |
|---|---|---|
| A | 950 PSI | 1200 PSI |
| B | 1850 PSI | 1950 PSI |
| C | 1700 PSI | 2100 PSI |
| D | 1825 PSI | 2175 PSI |
| E | 1800 PSI | 1925 PSI |
| F | 2700 PSI | 3100 PSI |

Gentlemen, this pressure drop is what it costs to merely deliver this grease to the point of application. Keep in mind as you review the perssure values on this chart that the modern automobile requires 6,000 PSI penetration to lubricate its toughest bearings.

**VI. CONCLUSION:**

The situation is not without a bright spot. In recent months one major petroleum producer has introduced on the market a faster flowing, lower pressure drop, multi-purpose grease.

Bearing design and the grease to lubricate them has been our primary factors of our development in the past, and there is every indication that they will remain such factors. We look to such organizations as the "N.L.G.I." for continued coordination of these factors to facilitate greater cooperation between industries in the future.

# Grease Characteristics That Significantly Affect Dispensers

By J. M. STOKELEY and R. M. MACDONALD
California Research Corporation

**California Research's J. M. Stokely presenting the side of the lubricating grease manufacturer. " . . . characteristics that significantly affect dispensing can be divided into two broad groups."**

### Introduction

For convenience of discussion, those grease characteristics that significantly affect dispensing can be divided into two broad groups. One group has a major effect on flow of grease from the high-pressure side of the gun through piping, fittings, dispensing hose, and finally into the automotive fittings. A second group of characteristics has a major effect on the flow of the grease to the suction side of the gun.

Flow of the grease on the high-pressure side of the system is dependent primarily on the effective viscosity of the grease and on the temperature of the grease and the dispensing system. Flow on the suction side of the pump is controlled largely by what is sometimes referred to as the "slumpability" of the grease, or the ability of the grease to flow in the container under gravity and suction head and maintain a seal at the pump inlet. The use of a properly designed follower plate or provision for positive feed to the suction side of the gun can minimize or eliminate the importance of slumpability.

### Factors Affecting Flow from the Pump

The viscosity of a grease or its resistance to flow depends upon several factors, including the viscosity of the constituent mineral oil, the hardness of the grease (this is primarily a function of thickener type and content and working history), the amount and type of additives, the temperature of the grease, and the length of time the grease has stood at that temperature. Each of these factors will be discussed individually.

### Mineral Oil Viscosity

In general, the rate at which a grease can be dispensed at constant temperature drops off as the viscosity of the oil contained in the grease increases. This is shown in Figure 1 in which it is seen that flow rate of calcium soap greases decreases approximately 50% as the mineral oil viscosity is varied over the normal range for commercial chassis greases. This decrease occurred without cavitation on the suction side. (In all cases unless otherwise noted, pumping was done with a conventional air-actuated grease gun of 40:1 pressure ratio at 150 psi air pressure.)

Thus, the grease manufacturer must sacrifice pumpability if he uses oils of high viscosity to increase the effectiveness of the grease as a chassis lubricant.

### Consistency

Soft greases can be dispensed more rapidly than hard greases. This is shown in Figure 2. The five plotted points represent five different grades obtained in the production of one batch of grease by removing samples from the mixer progressively as more oil was added. Thus, all the greases contain oil of the same viscosity and differ only in consistency as a result of the varying soap content. These greases contain lithium soap and mineral oil of about 1100 SSU at 100°F and 65 V. I., and the pumping was done at 84°F. In general, the dispensing rate is even more susceptible to the worked penetration of the grease than it is to mineral oil viscosity.

Here again a compromise is necessary; greater ease of dispensing requires softer greases, while retention in bearings demands the harder greases.

### Additives

Certain additives are known to have a profound effect upon the dispensing characteristics of lubricating greases. Probably the most significant of these are the stringiness agents. By increasing the concentration of such an additive in a calcium-base, semifluid tractor roller lubricant from 0.02% to 0.18%, the rate of dispensing was cut in half. These data are portrayed in Figure 3. In this experiment, a hand-operated volume gun was used, and the test temperature was 10°F. In another series of experiments on the effect of additives of a tacky nature, it was found that when the additive concentration was cut from 0.3% to 0.15%, the temperature of minimum acceptable dispensing rate was lowered by 10°F.

This type of lubricant containing large concentrations of stringiness additive is a specialized tractor roller lubricant used in large volumes in the western states, particularly in logging, agricultural, and highway construction operations. These tractors are often lubricated in the open at low temperatures, and therefore pumpability is of major importance.

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CHEMICAL DIVISION

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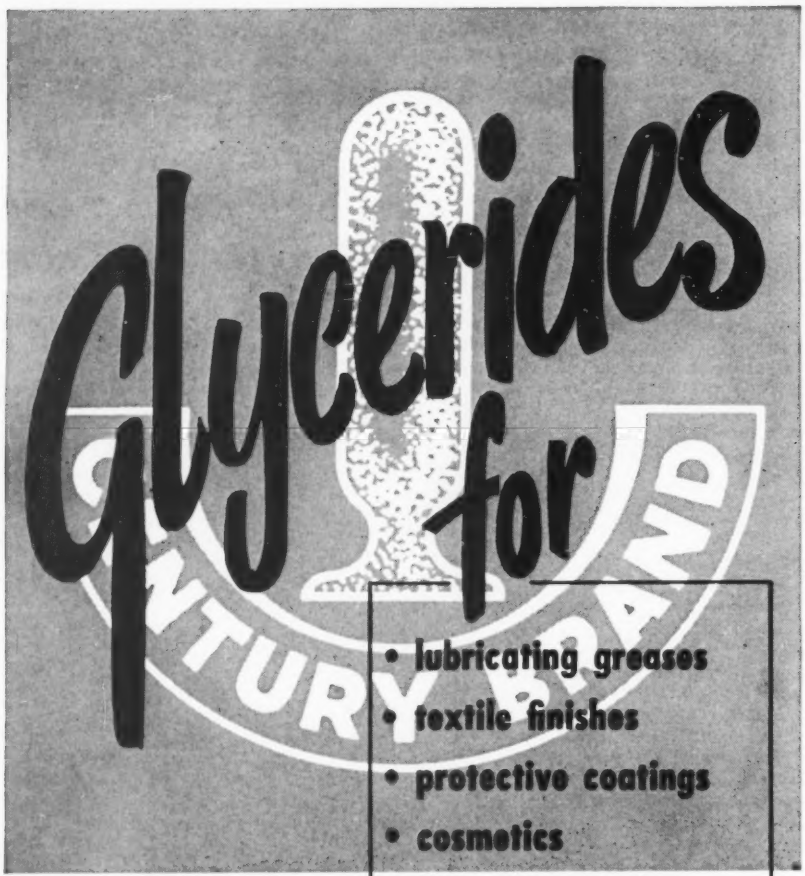
*progress thru research*

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| | |
|---|---|
| F.F.A. (as Oleic Acid) | 2.0 max. |
| Acid Number | 4.0 |
| Saponification Number | 176-184 |
| Iodine Value (WIJS) | 1-5 |
| Melting Point (°C) | 82-85 |
| Hydroxyl Value | 155-165 |
| Acetyl Value | 137-148 |

**CENTURY HYDREX 360** *(hydrogenated tallow glyceride)*

This hardened tallow product is available in beads and its good color, high titre and low iodine value particularly suit it for use in certain textile finishes and lubricating greases.

**SPECIFICATIONS**

| | |
|---|---|
| Titre | (136.4-140.0°F) 58-60.0°C |
| Iodine Value (WIJS) | 1-3 |
| Free Fatty Acid | 1-3% |
| Acid Number | 2-6 |
| Saponification Value | 190-195 |
| Color 5¼" Lovibond Column (Max.) | 15 Yellow-2 Red |

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### Grease Temperature

Lubricating greases, like all petroleum products, become more viscous as the temperature is lowered. This effect is large, as is shown by Figure 4. The data illustrated were obtained in pumping three grades of one type of grease, a calcium-tallow chassis grease, through a conventional grease gun to which was attached 10 feet of hose and a nozzle. At lower temperature, the increase in pumping rate for each 10°F rise in temperature is more than two-fold, but at higher temperatures, it is not so great. It is evident that if trouble is being experienced in dispensing grease at low temperatures, a rise in grease temperature of only 5°F can make a profound difference in the dispensing rate.

One important aspect of temperature and its effect upon dispensing should be mentioned, especially in connection with laboratory tests. It has been our experience that it is necessary to "soak" the container of grease for several days before equilibrium conditions are reached; otherwise, pumping measurements are not truly indicative of the behavior of the grease at that temperature. Figure 5 illustrates this cooling time lag. This factor is of importance in a practical way probably only where a fresh container of grease has been kept in unheated storage during the winter and is then brought into a heated garage or service station. While that portion of the grease close to the surface or sides of the container may come to room temperature rather rapidly, several days may be required for the center to warm.

The foregoing factors are the signficant ones governing the dispensibility of greases after they have been introduced into the pump. The factors governing flow to the suction stub of the pump, other than grease viscosity, will now be discussed.

### Factors Affecting Flow to the Pump

Two factors are of major influence on flow to the pump: The unworked consistency at the pumping temperature and thixotropy. These are of particular importance when a power-dispensing gun is not equipped with a follower plate.

### Unworked Consistency

As illustrated previously in Figure 2, the rate of dispensing a grease falls rapidly as the worked penetration decreases. This effect is apparent only after the grease has been drawn into the suction side of the pump and is being discharged against a pressure head. Consistency also has been found to influence the total amount of grease that can be pumped from a container. In pumping greases of increasingly harder consistency, a point is reached where the grease is too stiff to flow causing the grease pump to cavitate.

If a grease is hard enough, it is impossible even to start pumping. As the consistency decreases, it is found that a progressively larger fraction of the grease in the container can be dispensed. This effect is illustrated in Figure 6, in which are plotted the number of pounds of grease pumped from a 400-pound drum before cavitation set in as a function of the unworked penetration. With an unworked penetration of 155, cavitation set in immediately. At a penetration of 175, one-half of the barrel could be pumped out while two-thirds could be dispensed at penetrations of the order of 225. These tests

FIG. 1
EFFECT OF MINERAL OIL VISCOSITY ON DISPENSING RATE
CALCIUM SOAP GREASES AT 38° F.

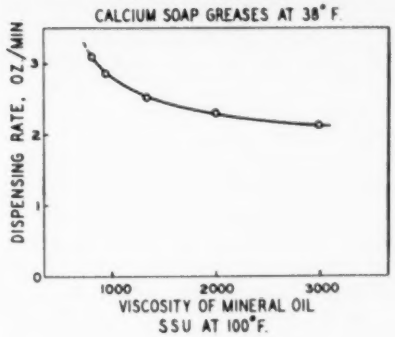



FIG. 2
EFFECT OF WORKED PENETRATION ON FLOW RATE
LITHIUM SOAP GREASE AT 84°F.

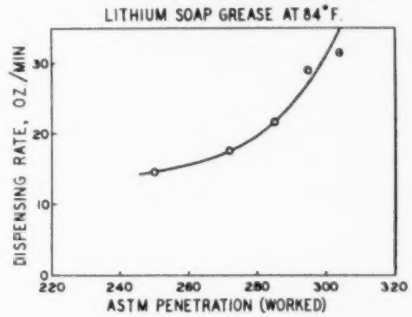



FIG. 3
EFFECT OF STRINGINESS ADDITIVE CONCENTRATION ON DISPENSING RATE
CALCIUM SOAP PRESSURE GUN GREASE

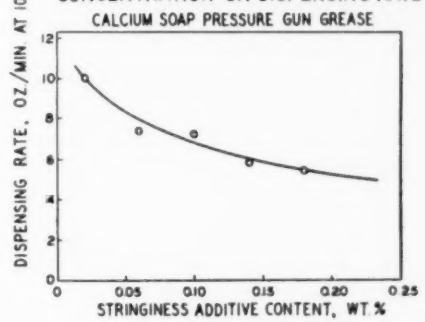
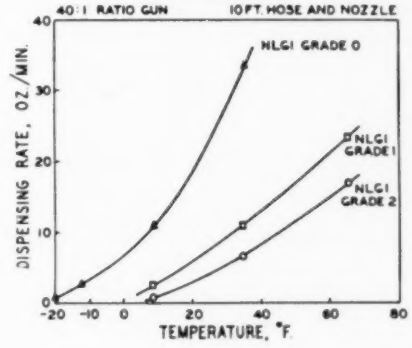



FIG. 4
EFFECT OF GREASE TEMPERATURE ON DISPENSING RATE
CALCIUM SOAP CHASSIS GREASE (THREE GRADES)
40:1 RATIO GUN 10 FT. HOSE AND NOZZLE



were carried out at an average temperature of 75°F, with different grades of the same grease, using an electrically driven pump.

In these tests, the level of the grease in the barrels receded uniformly as the pumping proceeded, and cavitation occurred by entrance of air along the pump suction line in the center of the container. Presumably, the grease immediately adjacent to the suction line was softer, due to the working of the grease by the introduction of the pump and by the vibration of the pump while operating. This softer grease apparently was removed more rapidly than the bulk unworked grease.

In general, we have found that unworked penetration can control the amount of grease removable from the barrel.

FIG 5

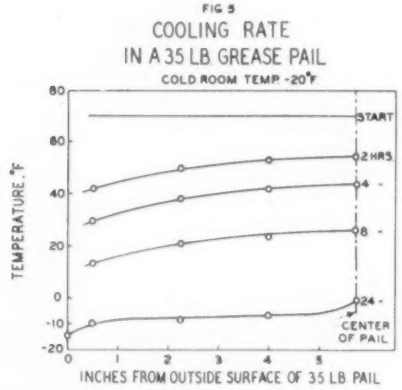



FIG 6

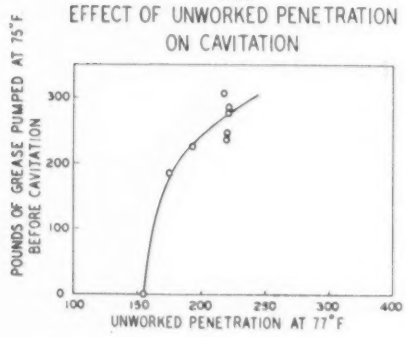
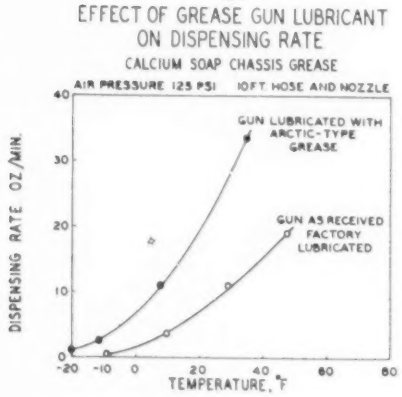



FIG 7


EFFECT OF GREASE GUN LUBRICANT
ON DISPENSING RATE
CALCIUM SOAP CHASSIS GREASE
AIR PRESSURE 125 PSI 10FT HOSE AND NOZZLE
GUN LUBRICATED WITH ARCTIC-TYPE GREASE
GUN AS RECEIVED FACTORY LUBRICATED
DISPENSING RATE OZ/MIN.
TEMPERATURE, °F

### Thixotropy

If left undisturbed, certain greases will gradually harden with time. If disturbed or subjected to any shearing stress, they rapidly soften to about their original consistency. If then left undisturbed, they again harden. This behavior is known as thixotropy. It is evident from the data already presented on the effect of unworked consistency of a grease on pumping rate, that it is extremely important that a grease show little or no evidence of thixotropy. An example of extreme thixotropy occurred some years ago in the development of an industrial steel mill grease. While this is not in the field of service station and garage greases, the principle involved is the same. At the time, inadequate attention was paid to thixotropy as related to greases. This particular grease, with a worked penetration of 350, satisfactorily passed all laboratory tests for the application intended. Several 400-pound drums of this grease were shipped to a steel mill for field testing. Tests on this grease were not started for at least three months after manufacturing and were initiated in the heat of summer. Difficulty was immediately experienced in dispensing this grease through a centralized lubrication system. Examination of the containers showed that the grease had hardened considerably while standing in storage. Even though the grease had been perfectly satisfactory in laboratory tests made shortly after its manufacture, within the short period of three months it became unacceptable. Subsequent to the field testing, laboratory tests to determine the rate of hardening were made in which one-pound samples were stored at 120°F and removed periodically for the determination of unworked penetration at 77°F. The penetration of the grease was found to drop from 350 to 170 in four days.

### Pressure Losses from Pipe, Fittings, and Shackles

Long dispensing lines to service pits and overhead dispensing systems introduce serious pressure losses. For example, a 40-foot line of one-fourth inch extra heavy pipe, such as is frequently used for overhead service station installation, required a pressure of 1900 psi to give normal dispensing rates at the end of the pipe with a calcium soap chassis grease at 70°F. Replacing this line with 40 feet of one-half inch extra heavy pipe lowered the pipe pressure drop to 400 psi. This approximates the ratio of the cross-sectional areas of the respective pipe sizes involved (0.072 square inch and 0.234 square inch.)

Similarly, the use of three-eighths inch hose and fittings instead of one-fourth inch gives a marked reduction in pressure losses with overhead hose reel installations. The cross-sectional area of three-eighths inch hose is over twice the area of regular one-fourth inch hose.

Surprising to most people is the large pressure drop through automotive shackle fittings. On new cars most fittings show a pressure drop of 3000 psi with individual shackles as high as 3400 psi. Older cars with worn fittings show approximately one-half this pressure drop for the average fitting, but individual fittings have been measured as high as 4000 psi.

Careful consideration must therefore be given to the design of the piping layout to avoid excessive pressure drop in the system which may result in inadequate pressure to lubricate tight shackles.

### Winterization of Pumps

At low temperature, the dispensing pump valve mechanism is extremely sensitive to the lubricant provided. This is shown by Figure 7, in which a factory-lubricated grease gun was relubricated with an arctic-type grease. Similarly, the dispensing rate of oil-lubricated guns can be markedly increased by a low-viscosity, low-pour oil, such as Automatic Transmission Fluid, Type "A" which is readily available in quart cans at all service stations and garages. Winterization of all grease guns for cold-room test work is essential to avoid gross errors in results.

### Conclusions

In designing the ideal automotive lubricating grease, there is conflict between those characteristics most desirable for best performance and those for easiest dispensibility. Compromises are necessary on penetration of the grease, viscosity, and viscosity index of the constituent mineral oil, and additives to secure optimum all-round performance. Another characteristic of significance is the possible tendency of the grease to harden in storage.

The piping used to carry the grease from the gun to the point of application should be large enough in diameter to minimize high pressure drops. For winter operation, the valve mechanisms of air-operated power guns should be lubricated with arctic-type lubricants.

# Proposed NLGI Method for Matching Dispensing Pumps with Lubricating Grease Properties

**By N. MARUSOV**
**Gulf Research and Development Company**

**Gulf's N. Marusov is shown discussing the method of selecting dispensing equipment and lubricating greases**

This part of the Symposium has a dual purpose. In addition to a Symposium discussion, this presentation is to serve as an amplified report of your NLGI Subcommittee on Delivery Characteristics of Dispensing Equipment for Lubricating Greases. This subcommittee, hereinafter called Panel, has been working since 1949 to develop a method for matching lubricating grease properties with grease dispensing pump behavior. The NLGI is fortunate to have on this Panel members representing both equipment manufacturers and lubricating grease producers.

Committee activity was needed because lubricant producers and equipment manufacturers had neither a common language with respect to the selection of a product that could be satisfactorily pumped in a given grease dispensing unit nor a satisfactory means of communicating with each other in order to combine their efforts toward the solution of their mutual problem.

The dispensing difficulties encountered can best be illustrated by expressions of representatives of both industries. The equipment manufacturers' general complaint is that their problems have been multiplied tremendously in the endeavor to keep pace with many and rapid changes which have occurred in the various types of greases marketed.

The grease producers' complaint is that the equipment manufacturer cannot answer the question, "What is the hardest grease which your gun will handle; whether hardness is expressed in terms of consistency, apparent viscosity, or what have you?"

As you all must realize, the complex nature of lubricating greases makes it difficult to answer the grease producers' question. Yet, the solution to the whole dispensing problem depends on being able to determine the limitations of the various pumps. These limitations should be stated in terms of the physical property of lubricating greases that defines their flow behavior; namely, the apparent viscosity.

When it is possible to establish the highest apparent viscosity that a pump will deliver at a satisfactory rate, then, from an apparent viscosity-versus-temperature chart, it will be possible to predict whether or not a lubricating grease can be satisfactorily delivered by that pump at a given temperature.

The Panel realized very early that the dispensing problem would break down into two separate phases. We call these phases slumpability and pumpability. Pumpability involves the pressure side of the pump, or flow of grease after it has entered the inlet port of the pump. From this point on, grease flow is dependent, to a large measure, on such factors of pump design as pressures,

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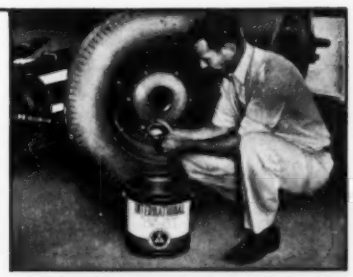

displacement, length of stroke, and internal flow resistance. Internal flow resistance is affected by swivels, hose length, check valves, and other flow passages within pump mechanisms. Delivery failures such as low rate of delivery and stalling are of a pumpability nature.

Slumpability involves the flow of grease inside the can; i. e., the ability of the grease to fall down and enter the suction stub. The driving forces in this area are due to the dead weight of the grease and atmospheric pressure. Cavitation, inability to empty the can, and air-binding are attributed to poor slumpability.

The proposed NLGI Method consists of three phases of development:

First—Development of a method that equipment manufacturers could use to find the highest apparent viscosity that their pump could handle.

Second—Standardize an applicable procedure by which the flow behavior of lubricating greases could be measured.

Third—Develop a method by which both sets of laboratory information could be combined to permit predicting whether or not a certain lubricating grease and dispensing pump combination would be satisfactory at a specific temperature.

It should be clearly understood that the Dispensing Panel's assignment is to develop methods only. It is not their responsibility or intention to assign limiting viscosities to the pumps or to predict whether a certain pump-grease combination will work.

The Panel is satisfied at present that these three objectives, from a pumpability standpoint, have been accomplished to the extent that a workable scheme is available.

Since time allotted for this Symposium does not permit a thorough discussion of all the details of procedure, the procedure under the title "Proposed NLGI Tentative Method for Matching Lubricating Greases with Automotive Dispensing Pumps at Adverse Temperatures" will be distributed to all Technical Committee members at a later date for their comments or approval.

Briefly, the proposed NLGI Tentative Method, as it affects the equipment manufacturer, describes in detail such items of pump test procedure as the duration of the soaking period at the test temperature, method of temperature measurement, design and application of an NLGI restrictor, method of observing test results, and the treatment of experimental data. The proposed NLGI Method also specifies that two ounces per minute will be the minimum satisfactory delivery rate.

To establish the limiting viscosities that pumps will dispense satisfactorily, it is necessary to measure and record the delivery in ounces per minute as obtained at various temperatures. These results are then transformed to permit plotting, on log-log coordinates, delivery as a function of apparent viscosity.

The intersection of the diagram and the two ounce per minute line then indicates the limiting apparent viscosity of the pump. Just what means will be employed by the equipment manufacturers to report the limiting viscosity for their pumps for the grease producers' use has not yet been decided. One proposal is to have this information engraved on each piece of equipment in code. Another is to include this information in catalogs, and the third is to handle the whole thing through correspondence. There are advantages and disadvantages to all three proposals. Nevertheless, since it is the Panel's desire to have the NLGI Method accepted willingly rather than complied with reluctantly, the wishes of equipment manufacturers and lubricant producers will be considered. We expect to learn their attitudes by distributing a questionnaire to all members of the Technical Committee when the Tentative Method is distributed.

The NLGI Method, as it affects the grease producer, defines the procedure for establishing the flow behavior of lubricating greases. This procedure is essentially the same as specified by the ASTM. The two major differences are that the apparent viscosity is measures at 200 sec. $^{-1}$ rate of shear only and measurements are made at temperatures that will give deliveries greater and less than two ounces per minute.

The ASTM Method for measuring apparent viscosity consists of forcing a sample of grease through a capillary by means of a floating piston actuated by a hydraulic system. From the flow rate, dimensions of the capillary and the force developed in the system, the apparent viscosity is calculated by means of Poiseuille's equation. The hydraulic system is such that for a given gear ratio, the grease is forced through the capillary at a constant rate, thus for a given capillary radius, the rate of shear remains constant. This arrangement simplifies calculations of the apparent viscosity. After the hydraulic system is calibrated for flow rate and the capillaries for diameter and length, constants can be calculated for each capillary and gear combination which will give the apparent viscosity in poises merely by multiplying by the pressure developed at the pump.

Normally, a set of eight capillaries and two different gear ratios are used to give a series of results at sixteen different shear rates. Since the NLGI Method needs results at only one shear rate, only one capillary and two gear ratios would be necessary. This will permit interpolating results at 200 sec. $^{-1}$ rate of shear. The results thus obtained at various temperatures are then plotted on log-log coordinates to give a diagram of apparent viscosity at 200 sec. $^{-1}$ as a function of temperature.

Since the results for measuring the apparent viscosity and the delivery of pumps are to be plotted on a curve, control of the temperature at a specific value is not essential. It is, however, important that the temperature of the grease during these tests be known with a reasonable degree of accuracy. An accuracy of $\pm$ 0.5°F. would be acceptable and should not be too difficult to obtain.

No difficulties are expected in this phase of the procedure, since nearly all grease producers have the ASTM viscometer, otherwise known as the S.O.D. viscometer, and are experienced in its application and its limitations.

It should be realized that because of the non-Newtonian and thixotropic behavior of lubrication greases, and because the pressures of the viscometer and the dispensing pumps are remote from the discharge openings, and the flow paths of both devices are complex, the proposed NLGI Tentative Method is based more on empirical treatment than on exact mathematical principles.

The combination of both sets of laboratory results depended on determining under what conditions good correlations existed between pressure viscometer results and minimum deliveries of the various dispensing pumps.

The exploratory work included full scale tests with five different makes of pumps and three different types of lubricating greases. Good correlation was obtained when minimum pump deliveries were compared with viscometer results measured at 200 sec. $^{-1}$. This shear rate approximates the shear rate in the restrictor at a delivery of two ounces per minute.

To apply the NLGI Method, the lubricating grease producers would need to prepare curves showing the apparent viscosity at 200 sec. $^{-1}$ as a function of temperature for the products to be used with dispensing pumps.

From the limiting viscosity of the pumps and the apparent viscosity-temperature diagram, it would then be possible to establish the temperature at which minimum delivery would be obtained.

By using temperature as a basis of evaluating the NLGI Method, the average difference between the results obtained by two operators using the same make of gun, irrespective of the type of grease, was less than $\pm 2$ Fahrenheit degrees. Should field experience verify this precision, the Panel's work will be done as far as the pumpability phase of the assignment is concerned.

From the slumpability standpoint, the Panel's progress is not too good. Even though many attempts were made to develop a method for classifying greases with regard to slumpability behavior, no satisfactory solution has been realized.

Even without definite slumpability specifications, the NLGI Method is of definite value since slumpability failures can be minimized to a large extent by the use of follower plates. There are other remedies too. For exaple, when air-binding occurs and there is too much grease left in the can, the operator can often correct the situation, at least temporarily, by rattling the can or bouncing it on the floor. If this fails, then he can scoop out the remaining grease and add it to the new drum.

The Panel will, however, continue with the problems involving slumpability. In the event that the Panel does develop suitable slumpability specifications, these specifications can be incorporated into the present NLGI Proposed Method.

It is necessary to emphasize, and as strongly as possible too, that the limiting viscosity of pumps that the NLGI requires the equipment manufacturer to make known is not a usable criterion for evaluating pumps on a basis of over-all pump performance. It is very seldom a wise judgment to assume over-all performance from a single point on a performance curve, especially if that point is obtained under conditions that give results on the threshold of satisfactory performance.

The diagrams of delivery vs. apparent viscosity for various models of pumps have different slopes. It is not unusual to have these diagrams cross each other. This means that even though one model pump may deliver a higher apparent viscosity lubricating grease at two ounces per minute than some other pump, it does not necessarily follow that the same pump will deliver more grease at some slightly higher temperature.

It would no doubt be an easy matter for an equipment manufacturer to make a pump with characteristics such that the pump would deliver a lubricant of extremely high viscosity at two ounces per minute, with little increase in delivery at temperatures normally encountered where the viscosity would be considerably lower. This pump would show up in good light if the NLGI value were used as a basis of evaluation. Actually, the user might be dissatisfied because of the low delivery at normal temperatures and because the amount of air required to drive the unit might be excessive.

These points are stressed because it is not intended that the NLGI Method should cause the design of pumps to be dictated in the direction of low temperature performance at the expense of good performance under those temperature conditions encountered during most of the year.

The future plans of the Panel include continuing with the problem of slumpability and following through by means of correspondence to learn how extensively the NLGI Method is used and to determine what degree of success is attained.

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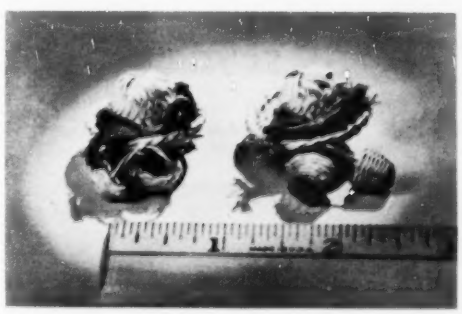
## *Two Hats . . .*



PICTURED *in the lower right corner are two hats received from an Argentine* SPOKESMAN *reader. Reproduced here full size, they were sent to both the Editor and Assistant Editor of the* SPOKESMAN *in appreciation for the publication. It isn't often we are so honored and it's good to know our official publication meets with such widespread and international approval.*

*We want to thank reader Helios A. Deilla for sending us these miniature reproductions of hats worn in Paraguay with their attached baskets.*

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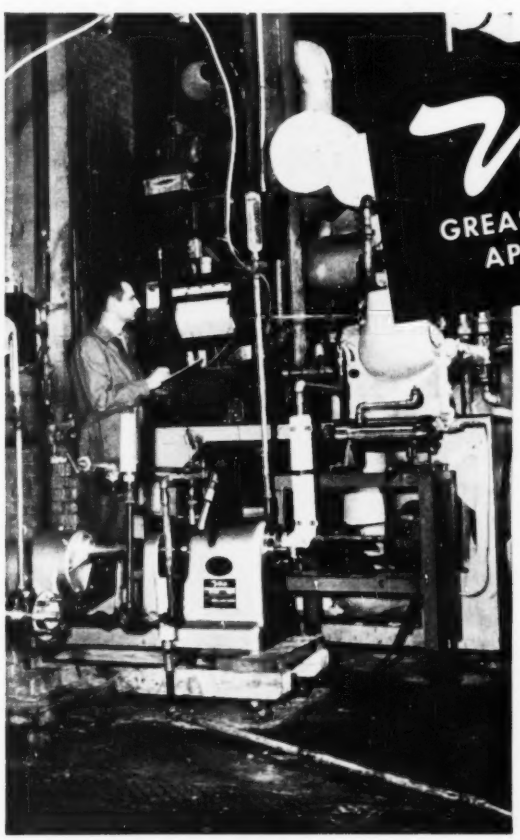
# Technical Committee

**Chairman T. G. Roehner, Director of the Technical Service Department, Socony-Vacuum Laboratories**

In October, Hugh Hemmingway was elected vice-president of NLGI and he became chairman of the program committee. With those added responsibilities he has found it necessary to resign as vice-chairman of the NLGI Technical Committee. We want to acknowledge the help which he gave the chairman during his service. His understanding of NLGI and lubricating grease industry problems was outstanding. Whenever advice was needed in guiding the Technical Committee programs, Mr. Hemmingway was prepared to give constructive comments. We are fortunate in obtaining John F. McGrogan, of The Atlantic Refining Company, as his replacement. Mr. McGrogan is well-known for his cooperative committee activities on projects involving lubricating greases. He has already demonstrated an aptitude for obtaining constructive results. He will take a leading part in planning the agenda for next year's meeting of the Technical Committee.

The Joint Committee on Lubricating Greases for Railroad Antifriction Journal Bearings held a meeting on December 1, in New York City. The minutes of that meeting, taken by Norman W. Faust of The Texas Company, will be distributed to all members of the NLGI Technical Committee. Those minutes may be briefly summarized as follows:

1. With certain qualifications, the motorized worker tester, covered by ASTM Method D-217-52T, has been recommended as the best available device for mixing greases to determine their compatibilities.
2. A subcommittee will study available information on tests for determining the effect of metals on oxidation of lubricating greases.
3. Another study group will report on test conditions to be recommended when laboratory full-scale functional testers are used.
4. It was decided that the joint committee should be continued indefinitely on an active status. Approval was received for two additional NLGI representatives, G. H. Link, of Shell Oil Company, and H. C. Zweifel, of Richfield Oil Corporation.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# Patents and Developments

### Continuous Production of Superior Greases

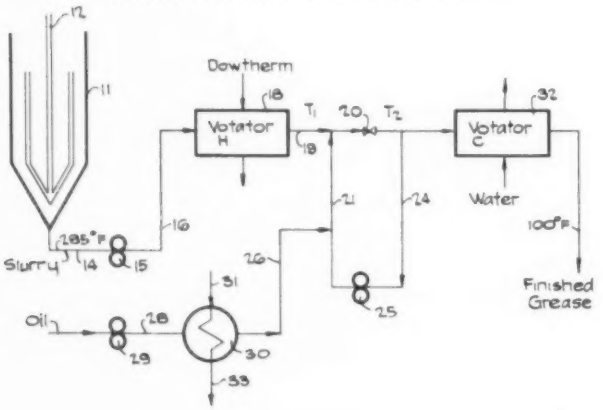
The preparation of superior greases is contingent upon the distribution of the gelling agent therein, e.g. a soap, such as a lithium hydroxy fatty acid soap, in the form of fibers or elongated "crystals" having a fairly high length-to-width ratio. The efficiency of utilization of the gelling agent as a thickening agent depends upon the degree to which the gelling agent is present as discrete fibers, in contrast to more or less isometric crystals or bundle of fibers. The amount of gelling agent (yield) required to achieve a given consistency (penetration) or mechanical stability is dependent upon this efficiency of utilization.

In U. S. Patent 2,652,366, Shell Development Company discloses a continuous method for producing what is claimed to be such a superior alkali metal soap-base grease, using the steps as diagramatically outlined in the flowsheet in Figure 1. The process comprises heating a slurry (say about 12% by weight) of the gelling agent, such as lithium 12-hydroxystearate, in the liquid lubricant carrier to approximately the solution temperature (say 380°F.) rapidly cooling (to say 330°F.) as by quenching, while working the resulting admixture at over 4000 ft. lbs. per lb. of finished grease, to a temperature substantially below (at least 25 F. below) the solution temperature, and cooling the resulting admixture to packaging temperature. Table I depicts the solution temperature for lithium 12-hydroxystearate in mineral oil:

**Table I**

(Solution temperature for lithium 12-hydroxystearate in mineral oil.)

| *Viscosity SSU at 100° F.* | *Solution Temperature, ° F.* |
|---|---|
| 100 | 375 |
| 170 | 381 |
| 490 | 385 |
| 750 | 386 |
| 1500 | 390 |




PROCESS FOR THE PREPARATION OF A LITHIUM HYDROXYSTEARATE GREASE

FIGURE I

In order to determine and demonstrate the critical influence of the various temperatures, such as the solution temperature, $T_1$, and quenched oil-soap temperature, $T_2$, upon the finished grease, a number of experiments were performed wherein various temperatures for $T_1$ and $T_2$ were employed. Additionally, to demonstrate the effect of varying amounts of work (shearing) performed upon grease during quenching as well as the influence of recycle ration, R, thereupon, i.e., the weight ratio of the recycle stream to the product stream to cooler 32, a number of experiments were carried out wherein these factors were varied.

Specifically, the experiments consisted of passing a concentrated slurry of gelling agent and additives (about 12% by weight of the total composition) in a mineral oil (750 SSU at 100°F. pale oil), said slurry having been obtained by saponifying hydrogenated castor oil glycerides with lithium hydroxide to obtain a lithium hydroxystearate soap, through a "Votator" type heat exchanger, thence into a recycle line wherein oil is injected, and shearing the resulting admixture by means of a suitably adjusted plug cock and then cooling the admixture in another Votator type heat exchanger. Quenching is accomplished due to the temperature differential which

EFFECT OF CONCENTRATE TEMPERATURE $T_1$ ON CONSISTENCY

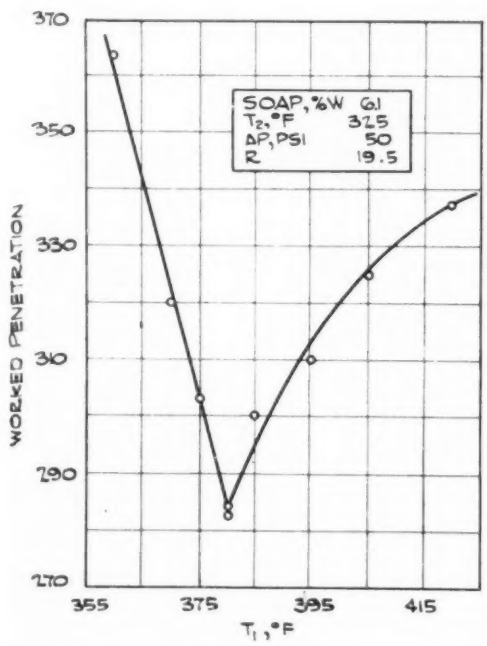



FIGURE II

exists between the top slurry temperature $T_1$ of the soap-oil admixture immediately after emerging from the aforesaid first heating Votator and the maintained recycle temperature $T_2$ of the quenched, sheared grease. This rapid cooling (quenching) should be accomplished as quickly as possible, for example, in less than one minute, preferably less than 30 seconds.

Steady-state conditions were deemed in effect when temperatures and pressure drops throughout the system were constant. By weighing the amount of oil injected and the total grease output for a given length of time, usually about 10 minutes, feed rates could be established for calculating soap content, usually about 6% by weight, of the finished product. All products were homogenized and complete ASTM penetration values according to ASTM D217-48, were obtained on the unhomogenized as well as on the homogenized grease. Free alkalinities were kept under 0.15% by weight expressed as weight per cent NaOH.

Throughout the process the physical and chemical properties of the oil, soap, the various other ingredients and additives employed and the concentrate stream entering the continuous recycle system were maintained and considered constant. It was considered unlikely that any substantial or important difference in the structure and properties of the soap-oil slurry concentrate would result if the saponification time in the kettle (wherein sponification of the glycerides to produce a lithium 12-hydroxystearate soap was carried out) were varied. However, in order to eliminate this possibility the rate of heating of the material therein was held constant. In addition, by holding the feed-stream rates of the slurry-concentrate to the heating-Votator constant, the effect of varying residence time in the heating-Votator was thereby eliminated.

Figure II is a graphical presentation of the influence of final soap-oil temperature $T_1$ (before quenching and shearing) upon consistency. The temperature $T_1$ for maximum "yield" is about 380°F.

Figure III is a graphical presentation of the influence of the recycle temperature $T_2$ (grease temperature after being quenched and worked) upon consistency of the grease. Shearing below 330°F. has a more deleterious effect on the "yield" than is gained from the greater degree of supersaturation and the accompanying increased rate of cooling. A relationship between optimum recycle temperature corresponding to maximum yield and the lower (frozen) transition temperature is indicated, the

EFFECT OF RECYCLE TEMPERATURE $T_2$ ON CONSISTENCY

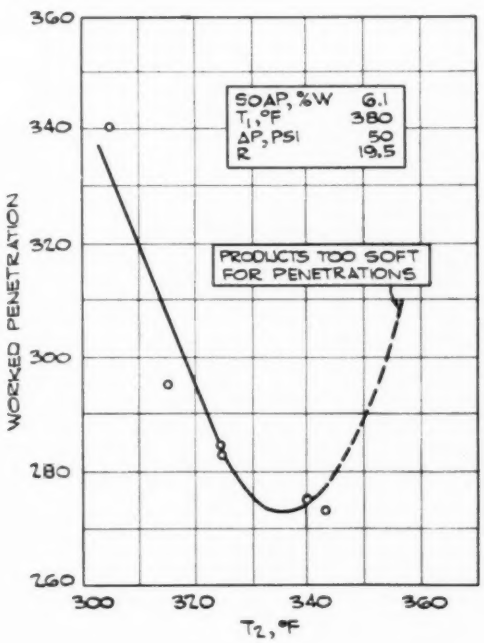



FIGURE III

RELATIONSHIP BETWEEN PRESSURE DROP AND RECYCLE RATE WITH RESPECT TO CONSISTENCY

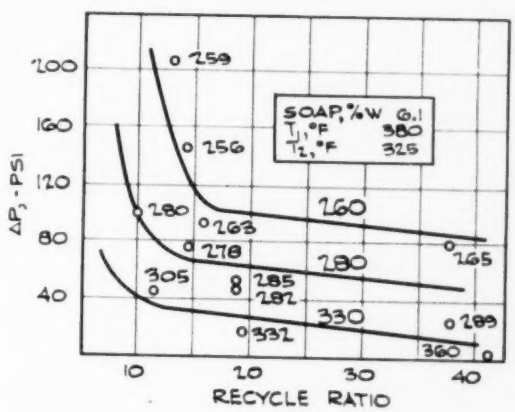



FIGURE IV

EFFECT OF WORKING ON CONSISTENCY

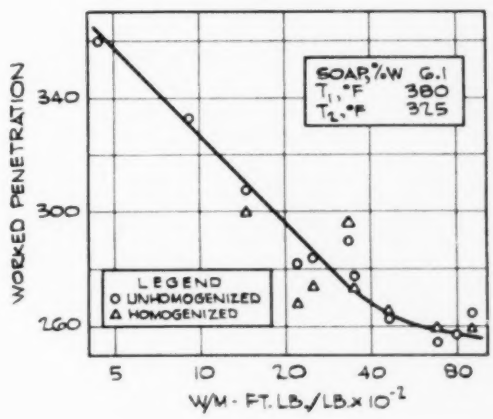



FIGURE V

optimum recycle temperature $T_2$ being 335°F.

Figure IV is a graphical presentation of the relationship between the pressure drop across the plug cock 20 (the shearing device) and the recycle ratio with respect to various penetration values of the grease, while Figure V shows the relationship between consistency (penetration) and the amount of shearing (work) performed upon the grease. It is apparent that the degree of shearing should be at least about 4000 ft. lbs. per lb. of finished grease, the optimum being about 8000.

### Breaking Soap Thickened Gels

An oil-soluble neutralized sulfonated mixture of polyalkylated benzenes, when added to soap thickened petroleum distillate or soap thickened crude oil gels in small proportions, is especially effective in breaking the gels.

According to U. S. patent 2,652,370 issued to Sinclair Oil & Gas Company, advantage of this property has been taken advantage of in improving productivity of oil wells in which the production formation permeability is increased by hydraulically fracturing the formation. This is done by injecting into the oil-bearing formation a viscous gelled liquid like Napalm under high hydraulic pressure. After the formation is fractured in this manner, the sulfonated mixture is introduced to break the gel readily.

This technique could be employed in breaking up grease into its components in the event a batch is spoiled or is otherwise unmarketable.

The gel-breaker employs as a raw material the bottoms derived from the production of dodecylbenzene (Neolene). The neutralized sulfonated Neolene bottoms apparently can be substituted by petroleum mahogany sulfonates in amount of 1-30 parts per 100 parts of the soap-thickened petroleum gel.

### Aluminum Soap—Carbon Black Thickened Greases

One Standard Oil Development Company patent (2,653,131) discloses aluminum soap grease compositions containing carbon black for lubricating heavy moving parts under conditions of extreme pressure, high temperature and high humidity. Reference is made to Patent 2,453,153 which disclosed carbon black-thickened greases and an application claiming a carbon black-soap blend having non-staining tendencies.

The carbon black structure per se does not seem to be as resistant as conventional soap systems to separation by means of pressure, which effects a practical limitation on the applicability of such greases in industry. This deficiency is claimed to be particularly noticeable in the lubrication of heavy equipment operating under extreme conditions of heat and load.

This difficulty in carbon black greases is claimed to be obviated by incorporating into the grease a minor amount of an aluminum soap of a substantially saturated high molecular weight fatty acid, which reduces markedly the tendency of oil separation and enables users of continuous greasing equipment to utilize the desirable high temperature and water-resistant characteristics of carbon black greases. Use of other soaps of sodium, lithium, barium, etc., with carbon black results only in minor improvement.

Commercial aluminum stearate may be used in amounts of 1.5-10% depending upon the desired final consistency. Amounts over 4% give very stiff greases. To obtain soft greases, only 1.5-3.5% of aluminum soap need be added. Mixed soaps, such as Napalm (naphthenic-fatty acid aluminum soap) may be employed. The amount of carbon black used may be 3-30%, although 5-15% is preferred.

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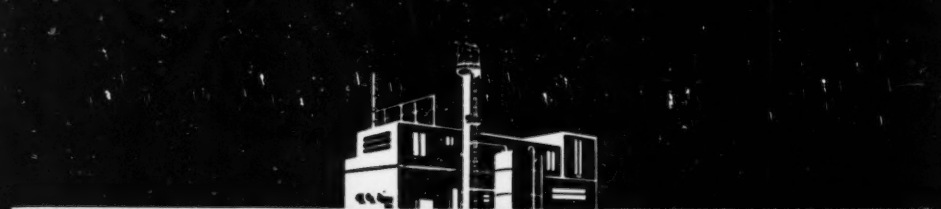


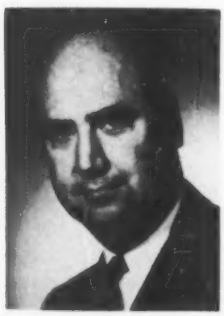
NEW MEMBER

# British American Oil Company Joins

## NLGI Welcomes British American Oil Company As an Active Member

### NLGI Company Representative

Roy O. Campbell was born in 1903, at Joplin, Mo. He obtained his B.S. degree in chemical engineering at the University of Missouri.



Roy O. Campbell

Mr. Campbell's first job was as research chemist with Phillips & Barnsdall Company. He worked three years with Skelly Oil as a research engineer. Mr. Campbell left the Neilan Company where he had been midcontinent chemical engineer to join B-A in 1931 as chief chemist at its Toronto refinery. Six years later he was made chief chemist of the manufacturing department. In 1944 he was named manager of the research and development department and in 1949 he became technical assistant in the marketing department at the head office, Toronto. He was appointed chief chemist of the manufacturing department in 1952.

Mr. Campbell is also a director of B. A-Shawinigan Ltd., a petro-chemical plant owned jointly by British American and Shawinigan Chemicals Ltd.

Mr. Campbell is a member of the American Chemical Society, American Society for Testing Material, Society of Automotive Engineers, American Petroleum Institute, S.A.E. Fuels and Lubricants Technical Committee, Member of C.O.S. Bench Test Group, C.L.R. Engine Oil Division of Coordinating Research Council, and Petroleum Committee of Canadian Government Specifications Board.

Mr. Campbell is married and has one daughter. He lists photography, thermionics, swimming, and skiing as his hobbies.

*Roy O. Rinearson is shown at his British American desk.*

### NLGI Technical Committee Member

Roy O. Rinearson was born at Hydro, Okla., in 1908. He took a course in business administration at Oklahoma A. & M. College, and attended the University of Oklahoma to study analytical chemistry.

From 1928 to 1939, Mr. Rinearson was employed by the Pure Oil Company at Muskogee, Okla. For four years he was with the Champlin Refining Company of Enid, Okla., where he was in full charge of grease operations. He did special work on calcium greases with the Hodson Corporation at Chicago, Ill., for a year. From 1944 to 1951 he was production manager for the Warren Refining Company.

Mr. Rinearson joined B-A in 1951 as a grease engineer at Head Office Man-

ufacturing department. He worked with the Nofsinger Company on the design and layout of the B-A grease plant built at Clarkson, Ontario. He was appointed superintendent there in August, 1952 and is at present superintendent of the grease plant and the compounding and lube blending plant, also at Clarkson.

He is a member of the A.S.L.E.

## British American Many Years In Canada

The new $1,500,000 grease plant that was officially opened at the British American Oil Company's refinery at Clarkson, Ontario, last June, was another highlight of the many that have shone for nearly half a century.

British American is the largest oil company owned by Canadians and the second largest in the nation. But its growth has been marked by a series of such significant developments that at present its full integration of production, transportation, refining, marketing and chemical make it an outstanding one in the industry, not only in Canada but on this continent.

The company was founded in 1906 by Albert LeRoy Ellsworth, a native of Welland, Ontario, who had gained petroleum experience working with a large U. S. oil company. At first the young company operated as a jobber and its sales were mostly of kerosene, a household necessity at that time. To guarantee the quality and uniformity of the products bearing the B-A trademark, a refinery was built in 1907 on a three-acre site on the Toronto waterfront to refine kerosene and manufacture industrial oils and greases.

Until 1909 the company's operations were confined to Ontario but in that year a Dominion Charter was obtained, and the company started marketing its products in Quebec.

Over the next ten years, with gasoline supplanting kerosene and the First World War creating an unprecedented demand for lubricants, a revolution took place in refinery methods. The company rebuilt its Toronto refinery, tripled its output and increased its acreage to 40.

In 1920 B-A purchased the Winnipeg Oil Company and moved into the market in western Canada. Up to this time all B-A's crude oil was imported from the U.S.A. and to ensure a permanent source of supply, The British-American Oil Producing Company and The Toronto Pipe Line Company were formed with headquarters at Tulsa, Oklahoma, in 1924-25.

In 1931, a new refinery at Montreal was opened and the first units of a lake tanker fleet purchased to keep the refinery supplied with East Texas crude. Three years later, a refinery was built at Moose Jaw, Sask., to help supply the growing western Canada market.

In 1935, B-A began marketing in the Maritime provinces and a year later ushered in a new era in Canadian petroleum by financing the completion of the first heavy crude producer in the Turner Valley in Alberta. The year 1936 also saw the company build an absorption plant at Longview, Alberta, and, by 1939, a new company refinery was in operation at Calgary.

To help meet petroleum demands of World War II, a refinery was built by B-A at Clarkson, Ontario, in 1943, for the manufacture of aviation fuels and lubricants. Another first was chalked up for B-A in 1944 with the opening of Canada's first gas repressuring and recycling system at the Longview plant to conserve the Turner Valley field.

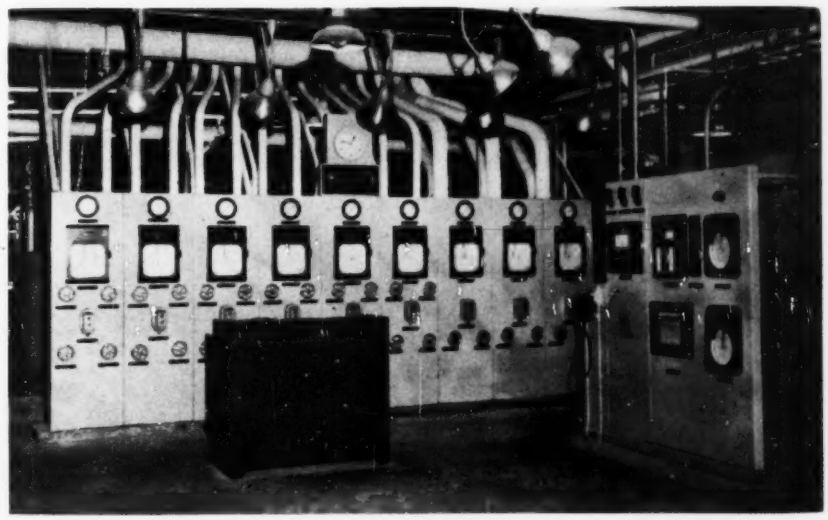
By 1946, B-A was operating in all ten provinces of Canada. The purchase of The Union Oil Company of Canada extended its marketing operations to the Pacific coast and Vancouver Island and for the first time B-A products appeared on the market in Newfoundland, transported there by company tankers.

An ambitious post-war expansion program was announced and put into effect. This included the expansion of the Montreal East refinery, whose completion in 1950 gave Canada its largest-capacity refinery and first catalytic cracking unit; the erection of the British American Oil Building at Toronto in 1951 to house nearly 700 Head Office and Ontario sales personnel; the construction of a completely new refinery at Edmonton; and the launching of the *B-A Peerless*, a 125,000-barrel lake tanker to carry western Canadian crude from the Interprovincial Pipe Line terminal at Superior, Wisconsin, to B-A's Clarkson refinery.

In 1952, expansion of the company's Moose Jaw refinery was completed, giving Saskatchewan its first catalytic cracking unit.

In May, 1953, B-A entered the petrochemical field in partnership with Shawinigan Chemicals Limited when the B.A.-Shawinigan Limited plant was officially opened at Montreal East. This plant is the world's first to produce phenol and acetone from petroleum by the oxidation of cumene.

Transportation facilities available to B-A were further enlarged with the June launching of the 150,000-barrel *B-A Canada*. The new tanker will join the company's world-wide deep-sea



**The control room of British American Oil's new grease plant at Clarkson, Ontario**

fleet of nine tankers under charter.

Work was started in the spring of 1953 on an $8 million addition to Clarkson refinery. Included in the addition are catalytic cracking and catalytic polymerization units.

B-A alone and in association with other companies has under lease or reservation approximately 5,000,000 acres of land; over 1½ million acres are in the Peace River area. The company also holds substantial producing interests in the United States, including acreage in the Williston Basin and West Texas. In total, B-A owns or has an interest in over 1,500 oil and gas wells in 13 states.

The opening of the 440-mile Trans-Northern pipe line between Montreal, Toronto and Hamilton, in which B-A has a one-third interest, gives the company a year-round outlet for refined products from its Montreal East refinery to Ontario markets.

The Platte Pipe Line, a 1,149-mile, 20-inch carrier, in which B-A has a 15 per cent interest, was dedicated in August. Presently capable of delivering 110,000 barrels daily, the line provides economical transportation for Rocky Mountain crude to central and mid-western refineries.

B-A has 7,000 dealers located all across Canada, 5,000 employees and approximately 24,000 shareholders, more than 95 per cent of whom live in Canada.

The company's unique position of being primarily a Canadian company with large oil producing and transportation facilities in the U. S. ensures additional growth and expansion.

## Clarkson Plant

British American Oil's grease plant at Clarkson, Ontario, has an annual production of 15 million pounds of quality automotive and industrial greases.

The entire grease plant is housed in a concrete block building covering 24,000 square feet of Clarkson refinery's 327 acres. It is located alongside a railway spur line beside the lube blending plant.

The part of the building which houses the storage tanks, process and utilities equipment is three stories high. The section occupied by the filling line, warehouse and shipping departments is of single-story construction. A covered loading platform extends the entire length of the building to facilitate handling of incoming and outgoing rail shipments. Provision is also made for truck shipments.

The plant has been designed to produce up to 15 million pounds of greases yearly. It operates almost entirely on raw materials of Canadian origin. The petroleum oils being used are naphthenic lube oils from Montreal East refinery and paraffinic lube oils from Clarkson refinery. Fats and fatty acids for the making of soap are purchased to rigid specifications.

Production from the plant will supply products B-A previously had to purchase to supply its markets for solid lubricants.

The plant is designed to produce a complete range of lubricants, including calcium greases, sodium greases, lithium greases, barium greases, mixed-base greases and non-soap greases.

Outdoor storage at Clarkson is provided by five tanks which hold various lube oil stocks. Each tank has a built-in suction steam heater to heat up the oil being pumped to the desired temperature, for easy handling regardless of outside temperatures.

Indoors, the raw materials are stored in tanks and kept at above-room temperatures by individual steam heaters.

The inside storage tanks have individual temperature controls and indicators. The pumps servicing the tanks both pump out and recirculate the oil in the tanks. A system of flexible hose and couplings permits pumping from any tank, indoors or out, into any other tank in the plant.

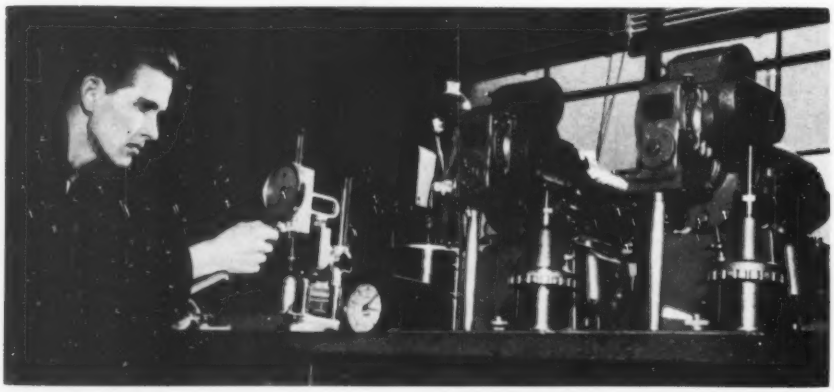
From the storage tanks, materials go to weigh tanks on the third floor. The flow is controlled from the instrument board on the second floor by hand-control valves. Weigh tanks are equipped with high level signals and overflow alarms. If overflowing occurs, it is trapped in a special tank designed for this purpose.

From the weigh tanks materials are directed to the second-floor reactor kettles. Again the flow is governed by the operator on the second floor. Scale dials and use of actual scales into which magnifying viewers have been set, permit the operator to control the quantity and weight of materials pouring into the kettles.

Because of varying quantities and types of greases manufactured, reactor kettles of several sizes and designs have been installed. For example, the 15,000-pound and 8,000-pound kettles are designed to operate under vacuum or pressures up to 150 lbs. p.s.i. A 12,000-pound kettle with a flat top operates only at atmospheric pressure.

After the greases have been properly mixed in kettles, they are pumped to the colloid mill, located on the first floor. Various pressures are required to maintain the flow of the various greases, but pumps are designed to maintain the desired pressure for each separate batch.

The colloid mill homogenizes the greases, completing the blending of the soap and oil mixture as homoge-



**Lab chemist is busy making penetration test at British American Oil's new lubricating grease plant at Clarkson, Ontario.**

*Plymouth*

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*Still Preferred for:*

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*Also Some New*

**EXTREME HIGH GEL GRADES**

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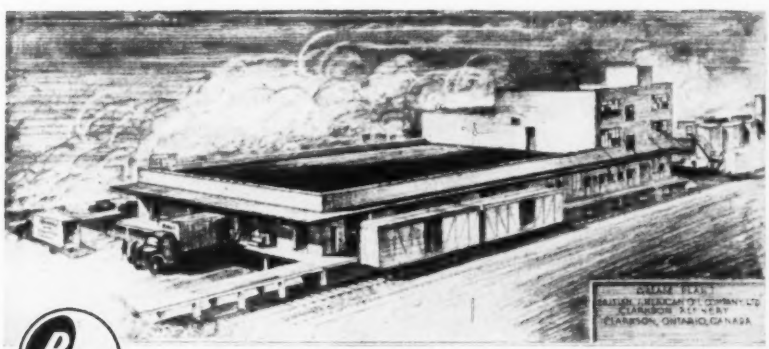
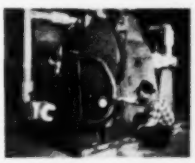


CONTROL BOARD

FURNACE

WEIGH TANK AREA

KETTLE MFG. AREA



DEAERATOR DEHYDRATOR

LABORATORY

# . . . *Inside and Outside*

**of British American Oil Company's New grease plant at Clarkson, Ontario.**

Designed by the C. W. Nofsinger Company, this modern grease plant can produce more than 15 million pounds per year on a 250-day (eight-hour) basis!

We will welcome inquiries concerning your proposed projects.

PILOT PLANT

THE C. W. NOFSINGER COMPANY

Engineers and Contractors for the Petroleum and Chemical Industries

906 GRAND AVENUE KANSAS CITY 6, MISSOURI

nizing completes the blending of milk and cream. Homogenizing of greases improves their lubricating qualities and storage characteristics.

From the colloid mill, the homogenized pass to the deaerator. This machine creates a vacuum which removes any remaining air and surplus moisture.

From the deaerator the grease is pumped to one of the three conveyorline filling stations. Automatic equipment is used for filling 25-pound pails. Such equipment for filling five and ten pound cans, and 100-pound kegs will be provided as volume production warrants.

The cycle for sodium grease described above takes slightly less than two hours. To meet the desired production rate of 60,000 pounds a day, each of the three main kettles makes slightly less than the two full batches per day.

One of the most important factors in the manufacturing of greases is the hot oil system which heats the kettles and contactor. Oil at temperatures of 450°-500°F. must be pumped through each vessel jacket at the rate of 200 to 300 gallons per minute.

The oil is heated in a gas-fired furnace two stories high. The furnace has a small radiant section, a tubular convection section and an air preheater. A circulating pump sends the jacket oil through the furnace into a surge drum. From there the jacket oil pump sends the oil to the heating jackets from which it returns to the surge drum. The same system can charge the jackets with cooling oil and the switch from hot to cold takes approximately one minute.

Despite the intricate machinery of the Clarkson grease plant its "heart" is a series of flat boards, pierced with numerous dial and control instruments. These are the control panels, conveniently located on the second floor adjacent to the contactor, kettles and inside storage tanks.

The instruments on the control panel allow the operator to control remotely the temperatures of liquid fats and oils being charged to any one of the kettles or the contactor. An additional instrument gives him remote control of the temperature of the circulating heating oil.

**The pilot plant of British American Oil's Clarkson, Ontario grease plant, shown here, is exact replica in miniature of main grease process units.**

Temperature through various sections of the process may be checked at any time by means of the multipoint potentiometer. Kettle and contactor temperatures can be checked on a four-point recorder.

Instruments of this type provide temperature recordings for each batch of grease made in the plant and make possible product uniformity and economical operation.

Just as the control panels are the heart of the grease plant, so is the laboratory the brain. The laboratory at Clarkson is completely equipped with all necessary apparatus for evaluating any greases manufactured and for developing new grease products. Here a staff of four chemists perform the important tests necessary in the manufacture of every batch of grease.

In addition, the lab staff is responsible for testing all raw materials used in the manufacture of the grease to ensure they measure up to rigid specifications.

Control testing is only part of the lab's job. It is responsible for the development of new lubricants. Special greases are made in 50-lb. batches in the pilot plant.

The pilot plant is equipped with a contactor and kettle, a miniature colloid mill and vacuum dehydrator-deaerator. Full capacity is 400 pounds and it duplicates on a reduced scale all operations of the new plant.

Careful records are kept so the lab can provide the plant with an exact formula and the most efficient process conditions to produce the required grease.

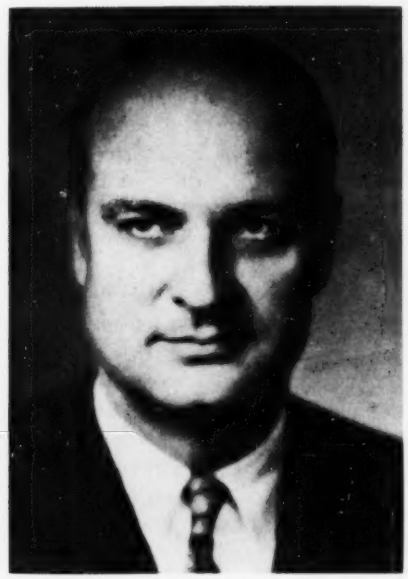
Months before the completion of the grease plant building, the pilot plant was set up in temporary quarters, developing the formulations and processes which enabled the Clarkson grease plant to turn out 100,000 pounds of high quality lubricants during the first full week of operation.

With the addition of the Clarkson grease plant to its manufacturing capacity, B-A became self-sufficient in grease production. For the first time our growing market in Canada for lubricating greases is being supplied by products developed, manufactured and packaged in our own plant under the most rigid supervision. The result is a complete range of highest quality greases which will, literally, help to turn the wheels of Canadian industry.

# PEOPLE in the Industry

## DEEP ROCK PROMOTES MURRAY AND CAMPBELL

William M. Murray



John G. Campbell

William M. Murray has been promoted to vice-president, Direct Sales, of Deep Rock Oil Corporation, it was announced by W. H. Garbade, president.

In this capacity, the 25-year company veteran will be in charge of the bulk sales of the company's products to compounders, refiners, marketers and manufacturers in both domestic and foreign markets. He will also handle sales of branded products distributed through channels other than the company's jobbers.

Deep Rock's bulk sales have become increasingly important in recent months, Garbade said, because of the new $2,500,000 lubricating oil plant at the Cushing, Okla., refinery. The new plant has greatly increased the company's output of lubricating oils and blending stocks. In addition, Deep Rock is taking a more aggressive position in the production of liquified petroleum gases and natural gasoline. The sale of these products will be under Murray's direction.

The new vice-president will supervise the bulk sales of the general line of refined products, lubricating oils, waxes, naphthas, fuels and specialties. As new products are developed by the company's research department, they will also be Murray's sales responsibility.

Working with Murray as department managers are W. W. Rice, industrial sales department, and Lehman H. Sullivan, lubricating oil sales department. Both department managers are located in the company's Tulsa office.

Murray is very active in industry trade circles holding memberships in a number of organizations including the 25-Year Club of the Petroleum Industry. He has been a member of the lubrication committee of the American Petroleum Institute's Division of Marketing since it was formed and is a past chairman. He is also chairman of two committees in the A.P.I.'s Division of Refining. In addition, Murray is a director of the National Lubricating Grease Institute and a silver card member (25 years) of the Society of Automotive Engineers.

The new vice-president is a native of Ohio and attended Carnegie Institute of Technology. He served as a Lieutenant in the regular Marine Corps in World War I.

John G. Campbell has been promoted to vice-president, Marketing, of Deep Rock Oil Corporation, it has been announced by W. H. Garbade, president.

Campbell moves into his new position from the post of general sales manager. He will supervise and coordinate functions of Deep Rock's jobber sales, merchandising, short stop, sales control, and supply and transportation departments.

The new vice-president joined the company in 1948 as head of the supplies and economics division. His prior industry experience includes seven years with a major oil company in transportation and supplies and economics work.

Campbell is a member of a number of industry trade associations including American Petroleum Institute, Independent Petroleum Association of America, and Mid-Continent Oil and Gas Association.

A native of Maryland, Campbell was graduated from Amherst college in 1930 and did graduate work at New York University. He saw active duty as a Lieutenant in the Naval Reserve in the Asiatic-Pacific theatre in World War II.

## Baroid Makes Changes

R. E. Souther, Baroid Sales Division employee for 14 years, was recently appointed manager of the new equipment department. This new department is a consolidation of the transportation department, testing equipment department, and the well logging shop.

Mr. Souther was chief engineer in the well logging department before consolidation. He received his degree in petroleum engineering from the University of Texas in 1939.

Clifford P. Blackburn, former news reporter and photographer, has been named advertising assistant for Baroid Sales Division.

Mr. Blackburn was graduated in June 1949, from the University of Missouri School of Journalism, where he majored in news and feature writing. He worked several years on the staff of the Lubbock, Texas, *Morning Avalanche* and on newspapers in Houston and California.

Mr. Blackburn will assist in the ed-

iting and designing of all Baroid Sales Division advertising and sales promotion items.

James M. Bugbee, Jr., is the new district sales representative for Baroid Sales Division in Oklahoma City. He replaces R. R. Morris, who has been transferred to Canada.

Mr. Bugbee has been with Baroid more than seven years. Most of his service has been in the field as a mud engineer, although he was first employed as a well logging engineer.

## Milton R. Bower Honored

Milton R. Bower, manager of lubricating oil sales, was honored for his 40 years of service with Standard Oil Co. of Ohio at a recent sales department luncheon in Cleveland. Mr. Bower joined Sohio in the accounting office of the old Northern Ohio District in November, 1913. Two years later he moved to the lubricating departing. He became manager for statewide lubricating oil sales in 1935.


GET
SOCONY-VACUUM
CORRECT
LUBRICATION

BACKED BY
THE WORLD'S GREATEST
LUBRICATION KNOWLEDGE
AND
ENGINEERING SERVICE

SOCONY-VACUUM OIL CO., INC.
makers of
Gargoyle Industrial Oils and Greases


## Gary Named Chief Executive Of Attapulgus Minerals

Attapulgus Minerals & Chemicals Corporation, through board chairman David E. Lilienthal, announces the election of Wright W. Gary as president and chief executive officer. The appointment became effective January 1.

For the past 11 years Mr. Gary has been president of the Filtrol Corporation. During World War II he was national director of refining for the United States Petroleum Administration.

Mr. Gary succeeds Louis R. Streander, who retired as president on January 1 after more than 40 years' service with the company. Mr. Streander will continue to serve Attapulgus as senior consultant.

Mr. Gary's offices will be located in Attapulgus' headquarters at 210 West Washington Square, Philadelphia.

## Socony-Vacuum Advances Henry Waszkowski, Jr.

Henry Waszkowski, Jr., has been appointed assistant to the co-ordinator of domestic production for Socony-Vacuum Oil Company, Inc., according to F. H. Wilcox, manager of the company's producing department. Mr. Waszkowski will report to E. C. Cram.

For 14 years Mr. Waszkowski has been associated with Magnolia Petroleum Company, Southwest affiliate of Socony-Vacuum, most recently as assistant superintendent of the producing district headquarters at Falfurrias, Texas.

Mr. Waszkowski joined Magnolia as a geophysicist after graduating from Louisiana State University as a petroleum engineer. He served as a lieutenant in the Navy in World War II. From November 1, 1952, until May 1 of this year, he was on loan to the government as assistant director of the production division of the Petroleum Administration for Defense at Washington. D. C.

He is a member of the American Institute of Mining and Metallurgical Engineering and an honorary member of Pi Epsilon Tau, petroleum engineering society.

## Bristol Appointed Shell Vice President

C. P. Bristol

C. P. Bristol, Shell Oil Company area manager at Tulsa, Oklahoma, has been appointed vice president in charge of the company's Tulsa exploration and production area, it has been announced by H. S. M. Burns, president.

Born at Altus, Oklahoma, Bristol received a degree in petroleum engineering from the University of Oklahoma at Norman. He worked with Shell during summer vacations.

Bristol started full time employment with the company in 1931 as a field engineer in the East Texas area and subsequently advanced through positions of increasing responsibilities in the production department at Black Bayou, Louisiana; Hobbs, New Mexico; and Houston, Denver City, and Kilgore, in Texas.

In 1944, he became division manager in the East Texas area and three years later was appointed chief exploitation engineer at Houston. He became production manager at Houston in 1950 and the following year moved to Tulsa in the same capacity.

He was appointed area manager at Tulsa last August.

## API Appoints Floyd Agriculture Chairman

The appointment of Ross Floyd, of Continental Oil Co., Ponca City, Okla., as 1954 Chairman of the Committee on Agriculture of the American Petroleum Institute was announced by Sidney A. Swensrud, Chairman of the Agricultural Advisory Committee of the API Board of Directors.

Floyd, Director of Continental Oil's agricultural service, will succeed M. C. "Mike" Enright, of Gulf Oil Corporation., Pittsburgh, Pa. Enright has been chairman for the past two years.

Swensrud, Chairman of the Board of Directors of Gulf Oil Corp., also announced the appointments of three vice chairmen, as follows:

Mark Butterworth, General Petroleum Corp., Los Angeles;

N. B. Curtice, Pure Oil Co., Minneapolis-St. Paul, Minn.;

Dr. K. G. Mackenzie, New York City, N. Y.

The API's Committee on Agriculture is a service organization whose objective is to help farmers and other rural residents understand and obtain better use of petroleum products.

Floyd, a native Oklahoman, is a graduate of Oklahoma A. & M. and a former vocational agriculture teacher at Nash and Cherokee, Okla. In 1925 he became assistant state supervisor of agriculture for Oklahoma, and held this position until 1935, when he joined the U.S. Soil Conservation Service. He spent eight years with this service before joining Continental Oil Company in 1946. Widely known as an author of many articles on agriculture, Floyd helped to organize and promote the Future Farmers of America during his service with the state of Oklahoma.

## Aviation Pioneer, Inventor, Dies at Washington

Clarence Edwards Earle, 60, inventor of lithium soap lubricating greases used in aircraft manufacturing, died November 25 in a hospital.

The invention which he gave to the Government during World War II, was credited with permitting safe operations of aircraft engines in extreme temperatures in the tropics and at high altitudes.

Earle, born at Bengies, Maryland, was a pioneer in aviation and was one of the nation's early free balloonists.

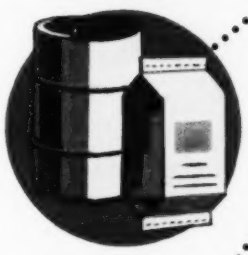

BIG 4 in "chemi-fats"

1. Adol fatty alcohols
2. Hydrofol glycerides
3. Hydrofol fatty acids
4. ADM sperm oil products

available for immediate shipment:

in working samples

Any standard or special "Chemi-fat" can be furnished for research and experimental purposes.

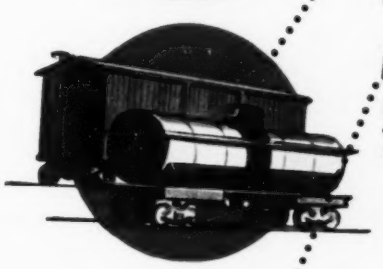


in bags or drums

Flaked and beaded fats are supplied in 50-lb. multi-wall paper bags. Liquid chemicals in 400-lb. steel drums.

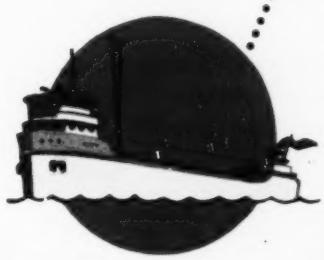
in carloads

Carloads, l.c.l., tank car, and less-tank-car shipments made promptly from eight conveniently located warehouses.



in shiploads

Marine shipments to foreign and domestic ports can be arranged for high-volume users.



write for free wall chart of ADM chemicals.

Easy-to-read tables give composition and specifications of 40 ADM "chemi-fats". (Chart is 17" x 27")

Other ADM Products:
Linseed Oil, Soybean Oil, Fish Oil, Paint Vehicles, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa Meal, Chlorophyll, Livestock and Poultry Feeds

Hydrofol PRODUCTS

ARCHER • DANIELS • MIDLAND COMPANY
Chemical Products Division • 2191 West 110th St. • Cleveland 2, Ohio

## GOODFELLOW AND MAKENAS ASSUME NEW DUTIES

William S. Goodfellow

Joseph P. Makenas

Rheem Manufacturing Co., in a consolidation and further decentralization of its midwest, east coast and southern operations, has named William S. Goodfellow as Eastern Division Manager with headquarters at the Rheem plant at 7600 S. Kedzie Ave., Chicago.

Goodfellow, formerly Central Division Manager, assumes responsibility for all Rheem manufacturing and marketing activities east of the Rockies, including plant activities in Chicago and at Philadelphia; Linden and Burlington, New Jersey; Sparrow Point, Maryland; New Orleans and Houston.

A veteran Rheem executive who has grown with the company in its rapid expansion to a position of world leadership in the manufacture of many home appliances and industrial items, Goodfellow's experience includes both manufacturing and sales activities. Prior to the company's decentralization program he was general sales manager for the company.

Joseph P. Makenas has been named Central Region Manager in charge of all of Rheem Manufacturing Company's manufacturing and marketing activities in the company's Chicago and Midwest area.

Makenas, who has been with Rheem since 1945, became plant manager in Chicago in 1948. His duties have been expanded since then to include not only production but sales and general administration of all Rheem activities in the area.

In his new assignment, Makenas succeeds W. S. Goodfellow.

## Hendrickson Promoted To Chicago Office

Promotion of J. O. Hendrickson from the Kansas City to the Chicago office of the Oil Industry Information Committee of the American Petroleum Institute was announced by Executive Director H. B. Miller.

Mr. Hendrickson, senior staff representative in the Missouri-Iowa-Nebraska District, was named senior representative in the Great Lakes District, which embraces Illinois, Indiana, Michigan and Wisconsin.

He succeeds John F. Campbell, former senior district representative in Chicago who recently was named regional supervisor for the mid-west. The promotion was effective December 1.

Mr. Miller also announced that Richard B. Joyce, of the Kansas City office, has been promoted to senior district representative there, succeeding Mr. Hendrickson.

Mr. Hendrickson has been with the oil industry public relations program since January, 1950. Joyce joined the program in May, 1953.

## H. P. Hobart, Gulf Oil Vice-President, Retires

Mr. Harold P. Hobart, a Vice-President of Gulf Oil Corporation and various of its subsidiary companies, retired from his executive duties on December 31.

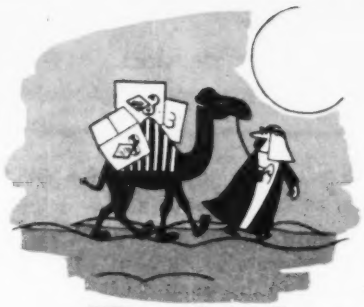
As Vice-President in charge of the Company's Domestic Marketing Department's Product Development and Product Engineering activities, Mr. Hobart has been concerned with the development and improvement of gasoline, fuel oil, lubricating oils; proper application of products for specific types of automotive and other motorized equipment; development of products for buses, trucks, and aviation equipment; and application and use of various fuels and lubricants and technical oils for industrial use. He has also been engaged in determining marketing and sales engineering policies for such products, and worked closely with the research and manufacturing departments on the development of new products and improvement of existing products.

A veteran of 34 years of service with Gulf, Mr. Hobart received his early education at the University School, Cleveland. After a year at Case Institute of Technology, he completed his studies at Yale University's Sheffield Scientific School, receiving his Ph.B. in Mechanical Engineering in 1910.

He joined Gulf in 1919 as Assistant to the General Manager of Wholesale Sales, after serving in the United States, England and France as a Captain in United States Army Ordnance during World War I.

He was elected a Vice-President in 1947 and two years later was appointed to the position from which he is now retiring.

Mr. Hobart is a member of the Duquesne Club, the Pittsburgh Golf Club, the Fox Chapel Golf Club at Pittsburgh, the Rolling Rock Club at Ligonier, Pa., the Yale Club of New York, the American Petroleum Institute, the National Lubricating Grease Institute, a Trustee of the National Petroleum Association and the Dollar Savings Bank (Pittsburgh), and a Director of the Pittsburgh Chamber of Commerce.



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*water-resistant,*
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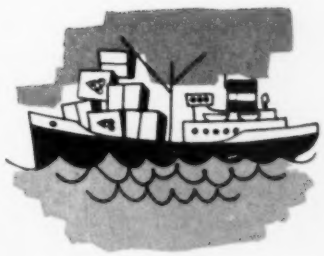

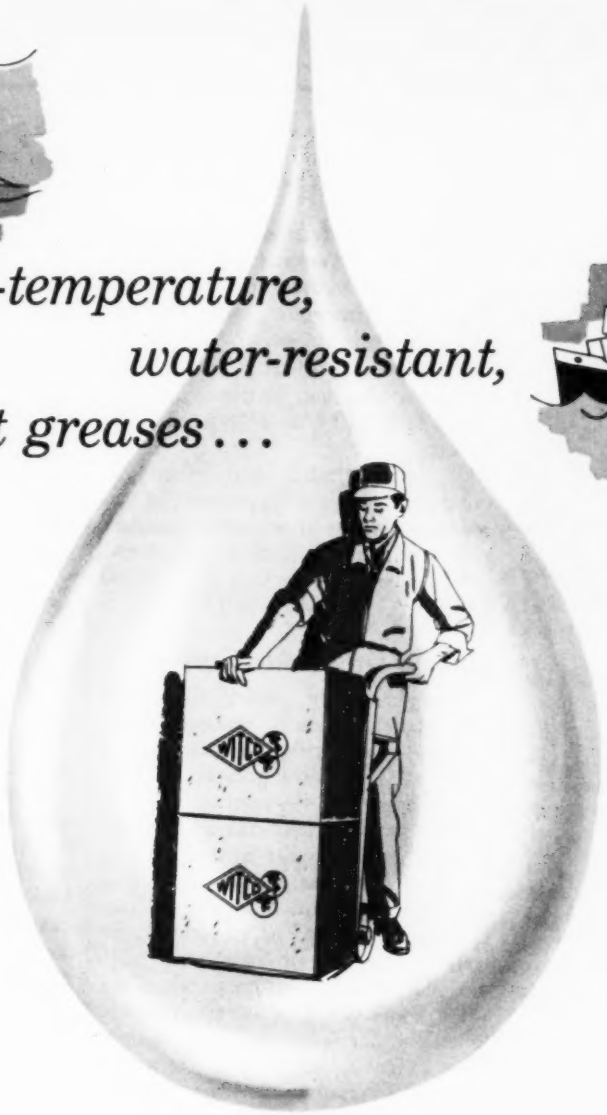

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# Industry NEWS

## New Emery Research Center

Emery Industries, Inc., has started construction of a new $800,000 research center. Adjacent to their plant in Cincinnati, the new building will provide new and larger quarters for the Departments of Basic Research, Development, and Chemical Engineering.

**$800,000 Research Center**

Constructed of brick, the two-story L-shaped structure will contain 30,000 sq. ft., and will house 28 individual laboratories in one wing with several "application" laboratories in the basement. Equipment in the latter rooms is designed to evaluate on a "plant" scale all of Emery's fatty acids, plasticizers, and textile oils in such end-use applications as plastics, rubber, textiles, soaps and detergents, cosmetics, molded products, alkyd resins, lube oils and greases, and metal working oils.

The new building will allow expansion of Emery's research facilities to accommodate approximately 100 people. Additional wings can be added to house another 150.

The other wing will contain the research executive offices, library and conference rooms.

Completion of construction is predicted for late 1954.

## Drum Standards Approved By Packaging Committee

The Petroleum Packaging Committee of the Packaging Institute has approved standards on several sizes of grease and oil drums for recommendation to the American Petroleum Institute-National Lubricating Grease Institute Joint Container Committee. The action was taken at a meeting November 16.

Recommendations cover 55-gal. and 400-lb. grease drums, a 120-lb. universal grease drum, 16-gal. oil drum and five-gal. tight head and lug cover oil drums.

"These recommendations are not binding on any company or manufacturer," said A. D. Murphy of Esso Standard, committee chairman, "but we urge their adoption to eliminate differences in sizes of containers."

Conversions can be made immediately and will not be expensive, he added.

A demonstration was given the committee of the approved 120-lb. universal grease drum with standard and available lubricating equipment.

Next quarterly meeting will be held February 23-24, 1954, in Houston.

## Lincoln Offers Air Coupler

A light-weight, quick detachable air coupler, recently announced by Lincoln Engineering Company is said to offer 35 per cent greater air flow, yet weighs only 4½ ounces.

The manufacturer states that the extra large air passage permits flow of 70 cu. ft. of free air per minute at 150 P.S.I. Instant coupling action eliminates twisting or turning. It instantly couples, or uncouples with one push or pull. Automatic air check valve shuts off flow of air instantly when coupler is detached from nipple. Free swiveling of coupler on nipple prevents kinking of air hose. Coupler cannot be detached accidentally. More information is available from Lincoln Engineering Company, 5701 Natural Bridge Avenue, St. Louis 20, Missouri.

## Archer-Daniels-Midland Issues Technical Bulletin

A new technical bulletin on Sperm Oil and Sperm Oil Products has been issued by the Chemical Products Division of Archer-Daniels-Midland Company, America's oldest and largest producers of marine oil derivatives.

The Bulletin is prepared in handy folder form for easy filing and quick reference. It covers characteristics, chemical and physical properties, and composition of twelve oils and waxes as well as solubility data.

Thirty-five of the most common uses in many industries from metalworking to textiles are included.

Copies can be supplied by writing directly to the company at 2191 West 110th Street, Cleveland, Ohio, and requesting Technical Bulletin No. 904-A.

## Ideco Products Handled By Jones & Laughlin

The Supply Division of Jones & Laughlin Steel Corporation has been appointed distributors of IDECO products in Canada and in the United States, excepting California, Washington and Oregon, Rainey Elliott, General Manager of the Supply Division has announced.

J & L's Supply Division, with headquarters in Tulsa, Okla., has 114 stores and sales offices in oil country locations in the United States and in Canada.

George W. (Jack) Walton, vice-president of IDECO, says that the addition of J & L's distribution facilities will greatly increase the availability of IDECO equipment in oil centers, and extend coverage to new areas.

IDECO, one of the Dresser Industries, manufactures drilling workover and servicing equipment. Recently they have introduced three new important drilling rigs. The smallest of the three is the Hydrair 35 which incorporates features formerly found on larger rigs. It is being sold either as a separate skid-mounted or as a trailer-mounted rig complete with drilling mast.

Next largest is the new torque-converter and mechanical series, introduced to meet the specifications for the 7000-8000 feet drilling depths in West Texas and Williston Basin.

The largest of the new rigs is in the 1800-hp class. It's the largest ever designed with hydraulic torque-converter drives.

Among the J & L products sold through the Supply Divisions are two new wire ropes, one with a spring core, the other with a core of solid plastic, drill pipe and casing, and drums and pails.

## USDA to Establish Research Fellowship

A fellowship for research on fatty acids derived from domestic fats and oils has been established in the U. S. Department of Agriculture by the Association of American Soap and Glycerine Producers, the Department and the Association announced jointly today. The work is sponsored by the Association's Fatty Acid Division.

This project will be part of the Department's research program aimed at finding new uses and wider markets for fats and oils. The study will be directed particularly to research aimed at broadening the industrial application of fatty acids, which comprise 90 per cent of the weight of our domestic fats and oils.

In announcing the project, the Department pointed out that increased production and lower consumption of fats and oils in the United States in recent years has caused mounting surpluses of these products. The problem is especially acute for animal fats. Surplus animal fats amounted to approximately 700 million pounds in 1952. To utilize these rising supplies, new uses must be found for oils and fats that will create new and larger markets.

In the research program on fats and oils at the Philadelphia laboratory, special emphasis is given to research work out of which new industrial outlets may be expected to develop. As a result of such work, markets for domestic fats have been opened up in such diverse fields as plastics, plasticizers, hot-dip tinning, synthetic rubber manufacture, and animal feeds.

## U. S. Steel Forms Non-Profit Corporation

The formation of a non-profit corporation to be known as United States Steel Foundation, Inc., was announced today by Benjamin F. Fairless, chairman of its board of trustees. The other trustees are members of the board of United States Steel Corporation.

The foundation will have its headquarters at 71 Broadway in New York City and will contribute to the support of exclusively charitable, educational and scientific activities and projects, primarily from grants received by it from United States Steel Corporation.


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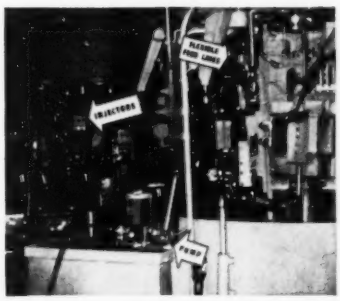
**Every Operating Executive should know about the Modern Trend in Industrial Lubrication... Controlled Application of Lubricants Are Essential to Plant Automation**

The practice of "Standardizing" everything from brooms to labor policies has long since proven its great economic value. And, at long last, Industry is recognizing the need for extending this practice to *both segments* of the Lubrication Function — lubricants and application devices — as the first vital step in solving a chaotic problem strongly influencing profit and loss in all operating categories.

"Plant Automation," defined as the automatic handling of materials in process, plus the instrumentation and controls which govern handling, processing and machining devices, is the conspicuous development of this decade in plant operating practices.

Greater Plant Automation depends on a corresponding Automation of Lubricant Application. There is no place in this development for machine downtime to accommodate the "Grease Monkey" with his oil can. Mass Centralized Lubrication for the automatic, controlled application of lubricants is the *proven solution.*

Multi-purpose lubricants applied through Centralized Lubrication Systems for controlling the application of lubricants, automatically, to all bearings on a single machine, or a bank of machines from a centrally located pumping unit, is the modern well-established trend in the practice of the Lubrication Function.




*Lincoln Centralized Lubricant Application Systems installed at Spicer Manufacturing which reduced maintenance cost 60% and increased production 20%.*

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# FUTURE MEETINGS of the Industry

**JANUARY, 1954**

14-15 Northwest Petroleum Assn., St. Paul Hotel, St. Paul, Minn.

18-22 American Institute of Electrical Engineers (winter general meeting), Statler Hotel, New York, N. Y.

**FEBRUARY, 1954**

8-10 Missouri Petroleum Assn. (annual convention), Chase Hotel, St. Louis, Mo.

11-12 Western Petroleum Refiners Assn., Hotel Belmont, Beaumont, Texas.

15-17 American Petroleum Institute (Lubrication Committee), Sheraton-Cadillac Hotel, Detroit, Mich.

17-18 Iowa Independent Oil Jobbers Assn., Fort Des Moines Hotel, Des Moines, Iowa.

22-24 National Tank Truck Carriers (top management conference), Palmer House, Chicago, Ill.

23-24 Packaging Institute (petroleum packaging committee), Houston, Texas.

24-25 Wisconsin Petroleum Assn., Schroeder Hotel, Milwaukee, Wis.

**MARCH, 1954**

1-5 American Society for Testing Materials (spring meeting), Shoreham Hotel, Washington, D. C.

2-4 Society of Automotive Engineers (national passenger car, body, and materials meeting), Hotel Statler, Detroit, Michigan.

3-5 American Petroleum Institute (Division of Production, Southwestern District), Rice Hotel, Houston, Tex.

8-10 American Inst. of Chemical Engineers, Statler Hotel, Washington, D. C.

8-10 Texas Oil Jobbers Assn. (annual convention exhibit), Baker Hotel, Dallas, Texas.

8-10 Oil Industry Information Committee, Shamrock Hotel, Houston, Texas.

16-18 Ohio Petroleum Marketers Assn. (annual convention and marketing exposition), Deshler-Hilton Hotel, Columbus, Ohio.

17-19 American Petroleum Institute (Division of Production, Mid-Continent District), Skirvin Hotel, Oklahoma City, Okla.

17-18-19 American Petroleum Institute (Division of Production, Mid-Continent District), Biltmore Hotel, Oklahoma City, Okla.

24 to April 1 American Chemical So-Society, Kansas City, Mo.

29-31 Western Petroleum Refiners Assn., Plaza Hotel, San Antonio, Texas.

**APRIL, 1954**

5-7 American Society of Lubrication Engineers (Annual Meeting and Exhibit), Netherland Plaza Hotel, Cincinnati, Ohio.

8-9 American Petroleum Institute (division of production, Rocky Mountain district), Townsend Hotel, Casper, Wyo.

12-15 Society of Automotive Engineers (national aeronautical meeting, aircraft engineering display, and aircraft production forum), Hotel Statler, New York, N. Y.

14-16 National Petroleum Assn. (51st semi-annual meeting), Cleveland Hotel, Cleveland, Ohio.

**MAY, 1954**

2-4 Independent Petroleum Assn. of America (midyear meeting), Cosmopolitan Hotel, Denver, Colo.

3-5 American Petroleum Institute (Lubrication Committee), Skytop Lodge, Skytop, Pa.

3-7 American Petroleum Institute (safety & fire protection committees, midyear meeting), Chase-Park Plaza, St. Louis, Mo.

6-7 American Petroleum Institute (division of production, Pacific Coast district), Statler Hotel, Los Angeles, Calif.

6-8 National Tank Truck Carriers (6th annual convention), Netherland Plaza, Cincinnati, Ohio.

9-11 Empire State Petroleum Assn., Roosevelt Hotel, New York, N. Y.

10-12 American Petroleum Institute (Division of Transportation, Products Pipe Line Conference), Warwick Hotel, Philadelphia, Pa.

10-13 American Petroleum Institute (Division of Refining, Midyear Meeting), Rice Hotel Houston, Texas.

16-19 American Inst. of Chemical Engineers, Springfield, Mass.

17-18 Empire State Petroleum Assn., Roosevelt Hotel, New York, N. Y.

17-19 American Petroleum Institute (Division of Marketing, Midyear Meeting), Cosmopolitan Hotel, Denver, Colo.

24-25 Packaging Institute (petroleum packaging committee), Cleveland, Ohio.

31-June 5 American Petroleum Institute (division of production, midyear committee conference), San Francisco, Calif.

**JUNE, 1954**

3-4 Pennsylvania Grade Crude Oil Assn., William Penn Hotel, Pittsburgh, Pa.

6-11 Society of Automotive Engineers (summer meeting), The Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.

13-18 American Society for Testing Materials (annual meeting and exhibits), Sherman Hotel, Chicago, Ill.

17-19 American Petroleum Institute (Division of Production, Eastern District), Greenbrier Hotel, White Sulphur Springs, W. Va.

21-25 American Inst. of Electrical Engineers (combined summer and Pacific general meeting), San Francisco, Calif.

**AUGUST, 1954**

16-18 Society of Automotive Engineers (national West Coast meeting), Los Angeles, Calif.

**SEPTEMBER, 1954**

12-16 Society of Automotive Engineers (national tractor meeting), Schroeder Hotel, Milwaukee, Wis.

12-16 American Inst. of Chemical Engineers, Colorado Hotel, Glenwood Springs, Colo.

12-17 American Chemical Society, New York, N. Y.

13-14 Packaging Institute (petroleum packaging committee), Philadelphia, Pa.

15-17 National Petroleum Assn. (52nd annual meeting), Traymore Hotel, Atlantic City, N. J.

**OCTOBER, 1954**

4-9 Society of Automotive Engineers (national aeronautic meeting), aircraft engineering display, and aircraft production forum, Hotel Statler, Los Angeles, Calif.

10-12 National Assn. of Oil Equipment Jobbers (4th annual meeting), Congress Hotel, Chicago, Ill.

Week of
Oct. 18 Society of Automotive Engineers (national transportation meeting), Boston, Mass.

20-21 Nebraska Petroleum Marketers Assn. (annual convention), Paxton Hotel, Omaha, Neb.

25-26 Independent Petroleum Assn. of America (annual meeting), Tulsa, Okla.

25-27 NLGI ANNUAL MEETING, MARK HOPKINS HOTEL, SAN FRANCISCO, CALIF.

25-29 American Institute of Electrical Engineers (fall general meeting), Chicago, Ill.

26-27 Society of Automotive Engineers, national diesel engine meeting, Hotel Statler, Cleveland, Ohio.

**NOVEMBER, 1954**

1-2 Independent Petroleum Assn. of America (annual meeting), Shamrock Hotel, Houston, Texas.

4-5 Society of Automotive Engineers (national fuels and lubricants meeting), Mayo Hotel, Tulsa, Okla.

8-11 American Petroleum Institute (34th annual meeting), Conrad Hilton Hotel and Palmer House, Chicago, Ill.

28 to Dec. 3 American Socy. of Mechanical Engineers, Statler Hotel, New York, N. Y.

29-30 Packaging Institute (petroleum packaging committee), New York, N. Y.

**DECEMBER, 1954**

12-15 American Inst. of Chemical Engineers (annual meeting), Statler Hotel, New York, N. Y.


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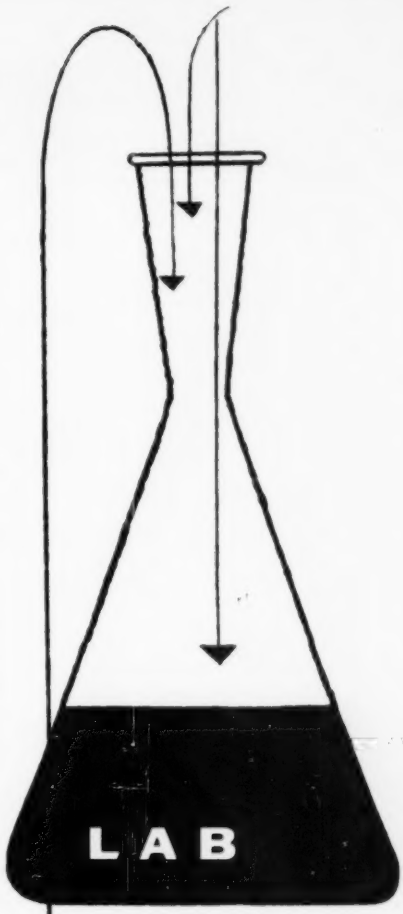


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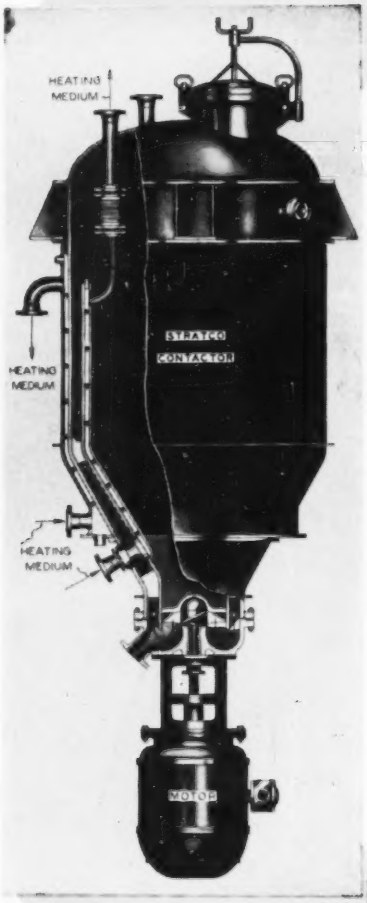


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